



Draft

Supplemental Environmental
Impact Statement
for
Land Acquisition and Airspace
Establishment
to Support
Large-Scale Marine Air Ground Task
Force Live-Fire and
Maneuver Training
at
Marine Corps Air
Ground Combat Center,
Twentynine Palms, California

September 2016



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SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

for

**Land Acquisition and Airspace Establishment to Support
Large-Scale Marine Air Ground Task Force Live-Fire and
Maneuver Training, Marine Corps Air Ground Combat Center,
Twentynine Palms, California**

September 2016



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SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS)

Lead Agency: United States Marine Corps, Department of the Navy
Cooperating Agency: United States Department of the Interior, Bureau of Land Management
Title of Proposed Action: Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training, Marine Corps Air Ground Combat Center, Twentynine Palms, California
Affected Jurisdictions: San Bernardino County, California
Designation: Draft SEIS

Abstract

In February 2013, the Department of the Navy (DON) signed a Record of Decision (ROD) regarding the 2012 Final Environmental Impact Statement (EIS) for *Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training*, Marine Corps Air Ground Combat Center, Twentynine Palms, California (Combat Center). The 2013 ROD documented the DON's decisions regarding establishment of a large-scale Marine Air Ground Task Force training facility at the Combat Center.

Since the 2012 Final EIS and 2013 ROD, the Marine Corps conducted detailed studies and worked with United States Fish and Wildlife Service, California Department of Fish and Wildlife, and the Bureau of Land Management (BLM) on alternative translocation plans for the desert tortoise, as required in the 2012 Biological Opinion. In light of new information gained from these efforts, the DON elected to prepare an SEIS focusing on the evaluation of potential impacts of alternative tortoise translocation plans. This Draft SEIS analyzes the potential environmental impacts of two action alternatives addressing different methodologies and locations for implementing a Desert Tortoise Translocation Program in support of large-scale Marine Air Ground Task Force live-fire and maneuver training. Potential impacts have been analyzed for biological resources, land use (including recreation), air quality, and cultural resources.

This Draft Supplemental EIS (SEIS) has been prepared by the DON in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] §§ 4321-4370h); Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); DON procedures for implementing NEPA (32 CFR Part 775); and Marine Corps Order P5090.2A, Change 3, dated 26 August 2013, *Environmental Compliance and Protection Manual*. The United States Department of Interior, BLM is a cooperating agency.

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EXECUTIVE SUMMARY

This Supplemental Environmental Impact Statement (SEIS) evaluates the potential environmental effects of implementing alternative plans to translocate Agassiz's desert tortoises (*Gopherus agassizii*) (hereinafter "desert tortoise"), as required in a 2012 Biological Opinion (BO) (USFWS 2012) and the 2012 *Final EIS for Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training, Marine Corps Air Ground Combat Center, Twentynine Palms, California* (hereinafter, the "2012 Land Acquisition/Airspace Establishment EIS" or "2012 Final EIS"). This SEIS has been prepared by the Department of the Navy (DON) in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] §§ 4321-4370h); Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508); DON procedures for implementing NEPA (32 CFR Part 775); and Marine Corps Order P5090.2A, Change 3, dated 26 August 2013, Environmental Compliance and Protection Manual. The United States (U.S.) Department of Interior, Bureau of Land Management (BLM) is a cooperating agency.

In February 2013, the DON signed a Record of Decision (ROD) regarding the 2012 Land Acquisition/Airspace Establishment Final EIS. The 2013 ROD documented the DON's decisions regarding establishment of a large-scale Marine Air Ground Task Force (MAGTF) training facility at the Combat Center. Since the 2012 Final EIS and 2013 ROD, the Marine Corps has conducted detailed studies and worked with the United States Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and the BLM to develop alternative translocation plans for the desert tortoise, as required in the 2012 BO. In light of new information gained from these efforts, the DON elected to prepare an SEIS focusing on the evaluation of potential impacts of implementing the alternative tortoise translocation plans. This SEIS analyzes the potential environmental impacts of a No-Action Alternative (implementation of the 2011 General Translocation Plan [GTP] that was considered in the 2012 BO and 2012 Final EIS), and two action alternatives, which represent different refined methodologies and locations for implementing a Desert Tortoise Translocation Program at the Marine Corps Air Ground Combat Center (hereinafter, "the Combat Center" or "MCAGCC"). Pursuant to 40 CFR 1502.9(c)(4), the DON will prepare, circulate, and file this SEIS in the same fashion (exclusive of scoping) as it did the draft and 2012 Final EIS. Potential impacts have been analyzed for biological resources, land use (including recreation), air quality, and cultural resources.

A 2011 Biological Assessment (BA) (DON 2011) prepared in conjunction with the 2012 Final EIS identified that the desert tortoise, a federally and state-listed threatened species, is likely to be adversely affected by Marine Expeditionary Brigade (MEB) training in the Western Expansion Area (WEA) and Southern Expansion Area (SEA) on the Combat Center (Figure ES-1). The USFWS issued the 2012 BO in response to the 2011 BA. Several conservation actions were recommended in the 2011 BA, and approved in the 2012 BO, among them a plan to translocate tortoises from medium- and high-intensity MEB operating areas in the WEA and SEA before training exercises begin in those areas.

ES.1 PURPOSE AND NEED

The purpose of the proposed action evaluated in this SEIS is to study alternative plans in support of the project that was described in the 2012 Final EIS, selected in the 2013 ROD, and authorized by the Fiscal Year (FY) 2014 National Defense Authorization Act (NDAA). The 2011 GTP (MCAGCC 2011), developed during the section 7 Endangered Species Act (ESA) consultation on the 2012 Final EIS proposed action, identified proposed recipient areas, translocation methods, and research treatments based

on information available at the time of publication. Studies were conducted over the following 3 years to provide information necessary to refine these areas, methods, and treatments. The 2011 GTP explicitly recognized that as a result of these studies, the Combat Center could refine these areas to specific sites and determine better recipient sites not considered in the 2011 GTP. The results of these efforts, and further consultation with USFWS and CDFW, identified refinements to translocation methods, recipient sites, and research treatments that could better support the goals of the translocation effort (and became the basis for the action alternatives considered in this SEIS). The alternative selected in the ROD for the SEIS will be implemented prior to conducting the sustained, combined-arms, live-fire, and maneuver field training for MEB-sized MAGTFs contemplated in the 2012 Final EIS.

The Marine Corps needs to implement the proposed action to satisfy requirements identified in the 2012 Final EIS and associated BO. The 2012 Land Acquisition BO concluded that the implementation of the Preferred Alternative would likely result in the “take” of desert tortoises associated with military training, tortoise translocation efforts, and authorized and unauthorized off-highway vehicle (OHV) use by recreationists displaced from former areas of the Johnson Valley OHV Area.

The 2013 ROD committed the Marine Corps to the following measures from the 2012 Land Acquisition BO issued by the USFWS (see Section 1.3.2 for additional details on these measures):

- Establish new Special Use Areas (areas that have not been identified as part of the training scenarios and that contain habitat supporting desert tortoises);
- Translocation Program;
- Desert Tortoise Headstart Program and Population Augmentation; and
- Monitoring.

ES.2 PROPOSED ACTION AND ALTERNATIVES

Alternatives for implementing the proposed action must be considered in accordance with NEPA, CEQ, and DON regulations for implementing NEPA, and Marine Corps Order P5090.2A. However, only those alternatives determined to be reasonable relative to their ability to fulfill/meet the purpose of and need for the proposed action require detailed analysis.

The 2011 GTP (MCAGCC 2011; see also Appendix A) that was prepared in support of the 2012 Final EIS and associated BO is considered the No-Action Alternative in this SEIS. The intent of the GTP was to provide for the translocation of tortoises from training areas in the WEA and SEA that would experience high to moderate levels of impact from the proposed training activities, and to recommend further investigation of those factors that would be important determinants of translocation success and tortoise recovery. The BO identified conservation and mitigation measures the Marine Corps would need to implement to minimize the rate of mortality or injury to resident tortoises, including developing a detailed plan to translocate desert tortoises from areas that would experience impacts from training. Since the 2012 Final EIS and 2013 ROD, the Marine Corps has conducted detailed studies and has worked with USFWS and the BLM to refine the translocation plan for the desert tortoise, as required in the 2012 Land Acquisition BO. As a result of this effort, and in consultation with the USFWS, the Combat Center refined and developed two alternative desert tortoise translocation plans.

Under the No-Action Alternative, the Marine Corps would conduct translocation of desert tortoises at recipient areas as identified in the 2011 GTP and the Land Acquisition BO. The No-Action Alternative would include several recipient and control areas and identifies translocation methods, post-translocation monitoring, and other research that would provide important information about desert tortoise recovery

methods. As outlined in the 2011 GTP, the Combat Center has since conducted a 3-year program of surveys, literature review, and consultation with resource agencies, resulting in the preparation of a desert tortoise translocation plan in March 2016 (Alternative 1), which was further developed in June 2016 (Alternative 2), based on internal USFWS development of draft revised translocation guidance (USFWS 2016a). Alternatives 1 and 2 primarily differ from the No-Action Alternative in the selection of recipient and control sites and in the distribution of desert tortoises at each recipient site. Compared to the No-Action Alternative, Alternatives 1 and 2 would also include additional research studies and reflect updated information obtained from the 3-year program of surveys conducted since the 2012 Final EIS. Alternative 2 differs from Alternative 1 in that one less recipient site would be used, the pairing of control sites to one recipient site would be different, the Bullion control site would be located on the Combat Center instead of within the Cleghorn Lakes Wilderness Area, and translocation densities would be different (Figure ES-1).

The proposed action includes four fundamental and interrelated components that are reflected in the alternatives:

- ***Recipient and Control Areas.*** The 2011 GTP (Appendix A) identified criteria for selection of recipient areas that should be met for successful translocation to occur. These criteria are consistent with the goals, objectives, and recovery strategies of the 2011 USFWS revised recovery plan for the Mojave population of the desert tortoise (USFWS 2011a) and the 2010 USFWS plan development guidance for translocation of desert tortoises (USFWS 2010b).
- ***Translocation Methods.*** Translocation methods would include handling procedures, fencing, translocation, and clearance surveys. All tortoise handling would be accomplished by techniques outlined in the Desert Tortoise Field Manual (USFWS 2009), including the most recent disease prevention techniques (e.g., USFWS 2016b). Juvenile tortoises that are too small to wear transmitters would be moved to established juvenile pens at Tortoise Research and Captive Rearing Sites (TRACRS) where they may become part of the headstart program (the Combat Center's tortoise rearing program) or to Special Use Areas. Tortoise exclusion fencing would be installed along certain borders of the new Special Use Areas near maneuver or high use areas. Under the No-Action Alternative, temporary fences would also be installed around six constrained dispersal sites. Although the precise locations of such sites have not been determined, they would all be located on the Combat Center. Under Alternatives 1 and 2, temporary fences would also be installed at the constrained dispersal plot (Cleghorn Lake) and along the southern portion of the Bullion Range Training Area. Tortoises would be moved under the handling constraints identified in Section 2.1.2.1. Juvenile tortoises under 4.4 inches (11.2 centimeters [cm]) are highly subject to depredation by dogs/coyotes, badgers, and ravens. Tortoises below this size would be translocated to predator-proof enclosures until they are large enough to be released. Desert tortoises that exhibit moderate to severe nasal discharge would not be translocated, and may be sent to a USFWS-approved facility where they would undergo further assessment, treatment, and/or study. For up to the first 5 years following initial translocation, clearance surveys would be conducted in the high- and moderate-impact areas to remove remaining desert tortoises.

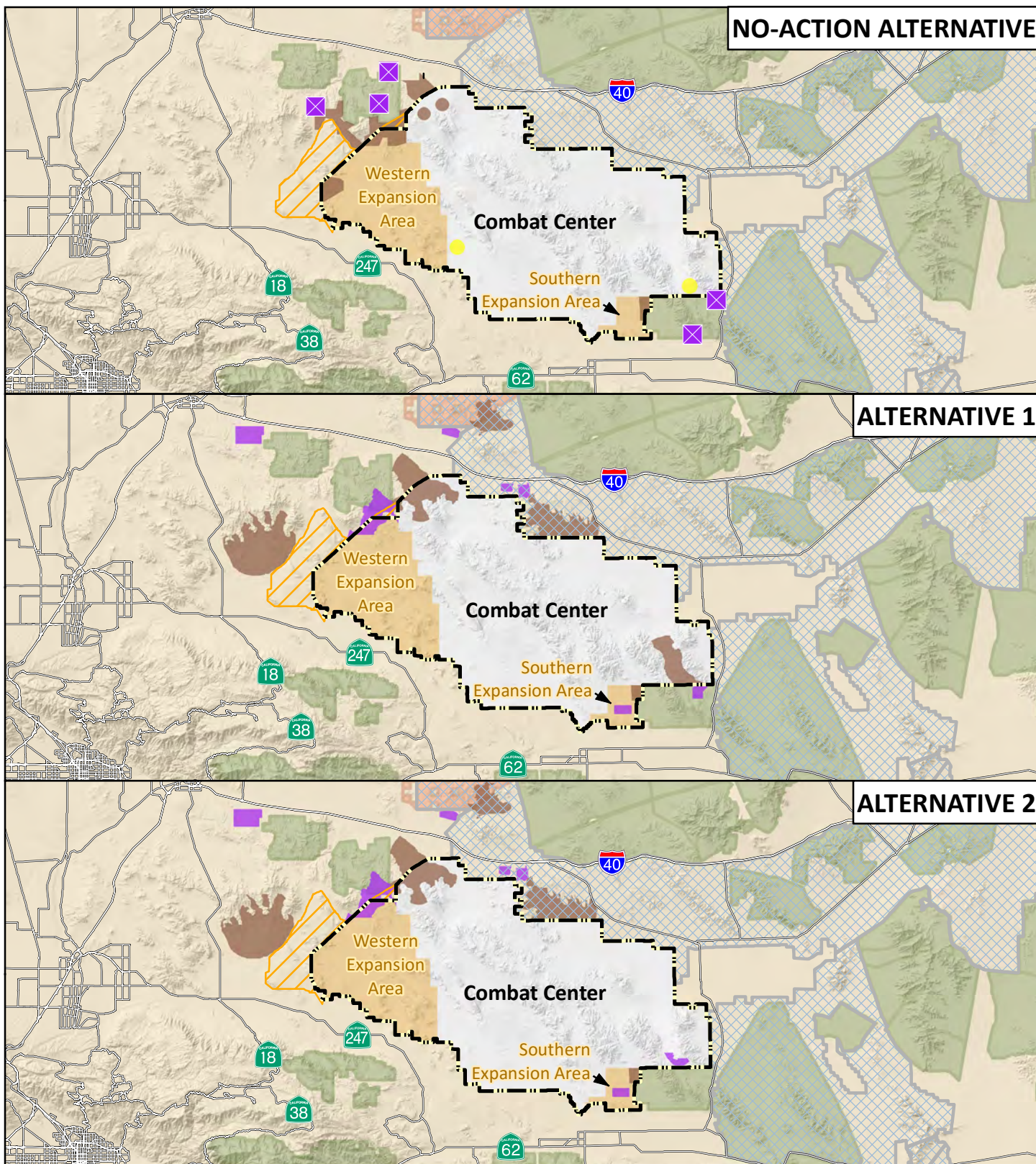
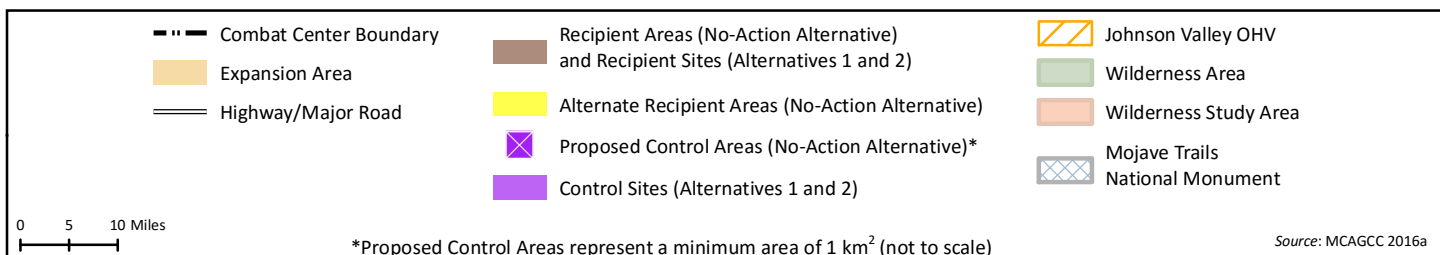


Figure ES-1. Recipient Sites and Control Sites Carried Forward for Analysis



- **Post-Translocation Monitoring.** Because of the size of the translocated population, radio-telemetry tracking of all tortoises is impractical. However, 20% of translocated tortoises, and a similar number of resident and control tortoises, would be tracked using radio-telemetry. Substantial information on survival of translocatees, as well as on population demography, repatriation, and health, can be gathered by repeated readings of mark-recapture plots where tortoises have been translocated. Mark-recapture plots would be used to estimate the tortoise population size by capturing, marking, and releasing a portion of the population, then later capturing another portion and counting the number of marked individuals. Capture, marking, and releasing activities would not involve any ground disturbance. Four subject areas would be investigated by monitoring, each of which is described below:
 - **Survival:** Survival of translocatees is the main metric for evaluating translocation as a take minimization measure. Survival of translocated tortoises would be measured using two methods: mark-recapture plots and tracking.
 - **Threats to survival:** Anthropogenic disturbances and predator populations that cause potential risks to recovery and translocation success threats would be assessed both qualitatively and quantitatively and compared to current levels.
 - **Habitat stability/changes:** Habitat would be assessed to monitor changes or stability during each reading of the mark-recapture plots.
 - **Health and disease:** The incidence of disease and other health issues would be monitored using body condition indices, clinical signs of disease, serology, and visual inspection for injuries. This would be accomplished using both telemetered tortoises and all tortoises captured on mark-recapture plots. Any health problems observed (e.g., rapid declines in body condition, perceived outbreaks of disease, mortality events) would be reported to the USFWS, CDFW, and BLM such that appropriate actions could be taken in a timely manner.
- **Other Research:** The Marine Corps, in consultation with USFWS, identified a research program to benefit recovery of the species. Research topics include translocation effectiveness, constrained dispersal (“repatriation” in the 2011 GTP), stocking densities, habitat, and disease. Two main research topics that would be implemented are summarized below, both of which are anticipated to provide results that are topical and important for recovery. Additional information about this research is available in the 2011 GTP (Appendix A).
 - **Experimental Translocation Densities:** The intent behind this research is to evaluate the capability of the habitat to sustain a certain density of tortoises.
 - **Constrained Dispersal:** Constrained dispersal (called “repatriation” in the 2011 GTP) is a technique wherein tortoises are translocated to a fenced site to encourage settling before the fence is removed.

Alternatives 1 and 2 are being carried forward for analysis, along with the No-Action Alternative. A comparison of features of these alternatives is provided in Table ES-1.

Table ES-1. Comparison of Alternatives

Component	No-Action Alternative	Alternative 1	Alternative 2
General Project Features			
Translocation	Translocation would occur as described in Section 2.1.2.3.	Similar to the No-Action Alternative, but with (1) different recipient and control sites; (2) different post-translocation densities; and (3) use of transport by helicopter to reduce transportation time and stress.	Similar to Alternative 1, but with (1) small difference in recipient and control sites; and (2) different post-translocation densities.
Fencing	Fencing would be installed as described in Section 2.1.2.2.	Similar to the No-Action Alternative except (1) fence locations would vary according to changes in recipient sites; and (2) permanent three-strand perimeter fence in specific locations (see Section 2.2.2.2).	Similar to Alternative 1 except no fence would be installed at the southern edge of the Bullion Training Area.
Subsequent Clearance Surveys	Same for all alternatives.	Same for all alternatives.	Same for all alternatives.
Post-Translocation Monitoring			
Monitoring	Post-translocation monitoring would focus on monitoring survival, threats to survival, habitat stability/changes, and health and disease.	Post-translocation monitoring is generally consistent with that described in the No-Action Alternative with the following exception: Tortoise predator control measures would be implemented.	Same as Alternative 1.
Other Research			
Experimental Translocation Densities	Research would be implemented with densities up to 22.5 tortoises per km ² .	Research would be implemented with densities up to 13.2 tortoises per km ² .	Research would be implemented with densities up to 10.5 tortoises per km ² .
Grazing	Grazing occurs; research would not be implemented.	Grazing occurs, research would be implemented at the Lucerne-Ord Recipient Site.	Same as Alternative 1.
Constrained Dispersal	Research would be implemented in four to six small constrained dispersal pens.	Research would be implemented in a single, larger site at the Cleghorn recipient site.	Same as Alternative 1.
Physical and Genetic Distance	Not Considered.	Research would be implemented for all release sites.	Same as Alternative 1.
Vertical Transmission of Disease	Research would be implemented on vertical transmission of disease.	Research eliminated from further consideration.	Same as Alternative 1.
Headstarting	Not Considered.	Research would be implemented at the TRACRS headstart facility.	Same as Alternative 1.

Table ES-1. Comparison of Alternatives (continued)

Component	No-Action Alternative	Alternative 1	Alternative 2
Land Use Overlap (acres): Recipient¹			
Wilderness Areas	0	0	0
Wilderness Study Areas	0	3,672	3,672
Mojave Trails National Monument	0	31,699	31,699
Grazing Allotment	17,355	12,189	12,189
Land Use Overlap: Control^{1,2}			
Wilderness Areas	4 Control Areas	6,397	4,387
Wilderness Study Areas	0 Control Areas	0	0
Mojave Trails National Monument	0 Control Areas	3,301	3,054
Grazing Allotment	2 Control Areas	9,485	9,485

Legend: km² = square kilometer; OHV = Off-Highway Vehicle; RTA = Range Training Area; SEA = Southern Expansion Area; TRACRS = Tortoise Research and Captive Rearing Site; WEA = Western Expansion Area.

Notes: ¹ Includes Recipient or Control Areas for the No-Action Alternative and Recipient or Control Sites for Alternatives 1 and 2.

² Control Area boundaries were not determined in the 2011 GTP, so acreage of overlap cannot be calculated. Overlap with specific land uses is reported in terms of the number of control areas that intersect these land uses.

This SEIS analyzes potential impacts for biological resources, land use (including recreation), air quality, and cultural resources. Cumulative effects of the proposed action in conjunction with other past, present, or reasonably foreseeable future actions are also analyzed.

ES.3 SPECIAL CONSERVATION MEASURES

Mitigation is an important mechanism federal agencies can use to minimize the potential adverse environmental impacts associated with their actions. Agencies can use mitigation to reduce environmental impacts in several ways. As defined in 40 CFR § 1508.20, mitigation includes:

- Avoiding an impact by not taking a certain action or parts of an action;
- Minimizing an impact by limiting the degree or magnitude of the action and its implementation;
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating an impact over time, through preservation and maintenance operations during the life of the action; and
- Compensating for an impact by replacing or providing substitute resources or environments.

Many federal agencies rely on mitigation to reduce adverse environmental impacts as part of the planning process for a project, incorporating mitigation as integral components of a proposed project design before making a determination about the significance of the project's environmental impacts. Such mitigation can lead to an environmentally preferred outcome and in some cases reduce the projected impacts of agency actions to below a threshold of significance. Such measures are often incorporated into the proposed action, as part of the planning process, such as agency standardized best management practices (BMPs) (e.g., to prevent storm water runoff or fugitive dust emissions at a construction site). For the purposes of this SEIS, such measures are referred to as Special Conservation Measures (SCMs). The SCMs would be included in the project design and, as an integral component of the proposed action, would be implemented with the proposed action. The CEQ regulations also require consideration of mitigation measures that are not already included as part of the proposed action. Such mitigation is distinct from SCMs as they represent additional measures, beyond the proposed action, that are being considered for further reducing, avoiding, and/or compensating for adverse effects outlined in this SEIS. The ROD for this SEIS will state which, if any, of these additional measures will be implemented. The SCMs presented in this section would be included in the proposed action to avoid or minimize potential impacts. SCMs and mitigation measures are summarized below.

ES.3.1 General Measures

1. A contract requirement would be to include BMPs to minimize potential impacts to surface water from construction activities (such as the use of hay bales or other barriers around excavation areas to trap sediment and prevent mobilization by surface water runoff; covering piles of excavated soil before the soil is backfilled into the trenches; proper procedures for contractors' laydown areas and equipment to prevent accidental fuel releases, etc.). Natural Resources and Environmental Affairs (NREA) personnel at the Combat Center would be required to inspect the construction sites and ensure that the contractor is complying with the BMPs.
2. All petroleum, oil, lubricants, and hazardous wastes/hazardous materials associated with the construction and inspection phases of the project would be used, stored, managed, and disposed of in accordance with all applicable federal, state, and local regulations and the Marine Corps Order P5090.2A (Environmental Compliance and Protection Manual [DON 2013]).

3. Another contract requirement would be the preparation of a project-specific Health and Safety Plan according to all federal, state, local and Marine Corps regulations and requirements. The Health and Safety Plan would identify potential safety hazards associated with the construction and inspection phases of the alternatives, and measures for preventing and minimizing them. The Health and Safety Plan would address such issues as safe heavy equipment operation and fueling; properly signing/flagging work areas; traffic control; backfilling all trenches at the end of the workday; securing equipment left onsite; slips, trips and falls; overhead hazards; and potential biological hazardous such as ticks, scorpions, and venomous snakes.
4. NREA and its contractors would be required to contact the MCAGCC Public Works Officer to locate all on-base underground utilities within the proposed fence alignment, and Underground Service Alert of Southern California (DigAlert) for the locations of all long-distance, commercial underground utility corridors while the project is in the design stage. The fenceline would be routed to avoid intersecting underground utilities in the project areas. If the fence alignment must cross over an underground utility, such as an underground natural gas transmission pipeline, the following procedures would be implemented to prevent contact with and damage to the underground utility:
 - 4.1 Utility company representatives would meet at the site with design/engineering staff. The utility company personnel would flag or otherwise mark at the surface the width of the underground utility corridor where the fenceline would cross. Geographic Information System (GIS) coordinates would be recorded for width of the underground utility at each the location where the fenceline would cross the utility.
 - 4.2 Project staff would design that segment of the fenceline such that the t-posts would be placed with a 2 feet (ft) (0.6 meter [m]) buffer on either side of the utility corridor.
 - 4.3 Project engineers/designers and utility company personnel would be on-site when t-posts are installed to provide direction to t-post installers to ensure that the utility line is avoided. GIS coordinates would be recorded for each t-post installed at either side of a utility corridor.
 - 4.4 Where the fence must cross an underground utility corridor, no trench would be excavated. Instead, the fence materials would be bent at a 90 degree angle to produce a lower section approximately 14 inches (35 cm) wide that would be placed parallel to, and in direct contact with, the ground surface (USFWS 2009). The remaining 22 inch (55 cm) wide upper section would be placed vertically against the t-posts, perpendicular to the ground and attached to the t-posts. The lower section in contact with the ground would be placed level with the ground surface and face inward toward the exclusion area (i.e., face toward the direction inside which the tortoises are meant to stay). The fence material on the ground surface would be buried with soil and rocks (rocks approximately 2 to 4 inches [5 to 10 cm] in diameter; larger rocks may be used where soil is shallow) to a depth of up to 4 inches (5 cm). A minimum of 18 inches (76 cm) of height space would be left between the rock surface and the top of the tortoise-proof fence (USFWS 2009). During the inspection phase, in the event that a t-post is found to be displaced, the GIS coordinates from the original installation would be used to ensure that the replacement is installed a safe distance from the underground utility.
5. The translocation plan anticipates that some recipient sites would be on lands managed by BLM. The following Stipulations would be employed on lands administered by BLM.

- 5.1 The Marine Corps would survey proposed helicopter landing sites for desert tortoises before use. All landing sites would be at least 100 ft (30 m) from any existing desert tortoise or burrow. Desert tortoises that enter an established landing site would be moved at least 100 ft (30 m) from activity within that site by an Authorized Biologist.
- 5.2 The Marine Corps would protect all survey monuments found within the right-of-way.
- 5.3 All vehicular traffic would be limited to routes that have been designated “open” (signed) by BLM. New access roads or cross-country vehicle travel would not be permitted. Use of any routes not designated “open” (signed) would not be utilized.
- 5.4 Before any helicopter landings, the Marine Corps would develop, and BLM would approve, an Aviation Safety Management Plan that would specifically address how potential conflicts between helicopter use and other area users would be resolved.
- 5.5 Before any helicopter landings, the Marine Corps would develop, and BLM would approve, a Spill Prevention Plan to address contingencies should a fuel spill occur. Fueling on public lands would not be authorized.

ES.3.2 Biological Resources

Three SCMs are proposed as part of the project to offset impacts to desert tortoises and desert tortoise habitat. These measures have been developed by the NREA Division at the Combat Center in consultation with the USFWS and are described in detail below.

6. An Authorized Biologist would be present during all fence installation activities to ensure that placement of the fence would adaptively avoid protected and special status biological resources (e.g., flora and fauna species) and long-lived woody vegetation.
7. Regular fence inspections (as described in Section 2.1.2.2, *Fencing*) would include monitoring and removal of any soil and plant debris that might collect at the fence.
8. In instances where desert tortoise eggs are translocated, nests would be protected with open-mesh fencing that permits hatchlings to escape but prevents predation by dogs/coyotes that might be attracted by human scent to the new nests. Alternatively, smaller mesh fencing or other techniques may be used to prevent ground squirrel predation on nests. Open-mesh fencing or avian netting also would be installed on the roof of the nest enclosure to prevent predator entry. Nests covered in material that would not allow hatchlings to exit would require monitoring from a 30 ft (9 m) distance for hatching activity. If possible, and following the Desert Tortoise Field Manual (USFWS 2009), hatchlings would be weighed, measured, photographed, described, and marked.

In addition, numerous standard or currently implemented SCMs would continue to be implemented. These are described in the 2012 Final EIS; the following discussion focuses on SCMS that are relevant to the proposed action that are not already incorporated into Sections 2.1, 2.2, or 2.3.

9. Upon issuance of the BO for the proposed project, the Combat Center would amend its Integrated Natural Resources Management Plan (INRMP) to incorporate the conditions for use associated with the new training areas and new/modified airspace.
10. The following measures from the 2002 Basewide BO (USFWS 2002), the 2012 Land Acquisition BO (USFWS 2012), the 2012 INRMP (MCAGCC 2012), and the current Combat Center Order 5090.4F (MAGTF Training Command 2011a), would be implemented:

- 10.1 The Marine Corps will ensure that personnel inspect beneath and around all parked vehicles, located in desert tortoise habitat, prior to moving the vehicle. If a desert tortoise is located beneath a vehicle and is not in immediate danger or impeding training, the Marines will allow the tortoise to move on its own or they will contact Range Control for instructions. Only appropriately briefed Marines, with direct radio or telephone communication with and authorization from Range Control, will move desert tortoises. In these instances, the Marine Corps will move desert tortoises only the minimum distance to ensure their safety.
- 10.2 During construction in areas that are not fenced with desert tortoise exclusion fencing, an Authorized Biologist will check open trenches at least two times a day, in the morning and evening, throughout the duration of construction. If midday temperatures are likely to be above 95 degrees Fahrenheit, one of these checks will occur one hour prior to the forecasted high temperature. The Marine Corps will leave open excavations only if they are temporarily fenced or covered to exclude desert tortoises. The Marine Corps will inspect all excavations for desert tortoises prior to filling.
- 10.3 If maintenance or construction occurs during a time of year when desert tortoises are active, the Authorized Biologist would ensure that clearance surveys have been conducted in all work areas within appropriate habitat immediately before the onset of work; that is, the clearance surveys would be timed to reduce, to the extent possible, the likelihood that a desert tortoise could move into a work area between the time the site is surveyed and the onset of work. The NREA staff would determine whether desert tortoises are likely to be active with consideration of the time of year and the weather conditions at the time and place where work is to be conducted. If desert tortoises are unlikely to be active, the clearance surveys may be conducted within 48 hours before ground disturbance. When desert tortoise burrows are found, they would be checked for desert tortoises; when desert tortoises are found, the burrows would be flagged. All unoccupied burrows would be flagged in a different manner than the occupied burrows. During the construction period, an Authorized Biologist would re-check the burrows and remove any desert tortoises that would be in danger by the mission-related construction activity.

Reporting Procedures (Adapted from the 2012 Land Acquisition BO and the 2002 BO)

- 10.4 The NREA office would maintain a record of all observations of desert tortoises encountered at the Combat Center. The information gathered would include the date and time of observation; whether the desert tortoise was handled and whether it voided its bladder; general health of the desert tortoise; and, if it was moved, the locations from and to which the desert tortoise was moved.
- 10.5 The Marine Corps would provide a written report to the USFWS by January 31 of each year, to document the numbers and locations of desert tortoises injured, killed, and handled; discuss the effectiveness of the Marine Corps' protective measures; and recommend other measures that allow for better protection of the desert tortoise or more workable implementation. The report would also include detailed information on the construction and maintenance projects that NREA personnel reviewed in the previous year; these projects include any actions that NREA staff determines are not likely to

adversely affect the desert tortoise and those that are likely to adversely affect the desert tortoise and that are conducted under the auspices of a BO.

- 10.6 If the Marine Corps is required to prepare any additional written reports as a result of biological opinions for activities it conducts at the Combat Center, the information from these reports may be included in this annual report.

Disposition of Dead or Injured Desert Tortoises (Adapted from the 2012 Land Acquisition BO and the 2002 BO)

- 10.7 Upon locating dead or injured desert tortoises, initial notification within 3 days of their finding would be made in writing to the Palm Springs Fish and Wildlife Office by telephone (760-322-2070) or electronic mail. The report would include the date, time, and location of the carcass, a photograph (if possible), cause of death, if known, and any other pertinent information.
- 10.8 Care would be taken in handling injured animals to ensure effective treatment. Injured animals would be transported to a qualified veterinarian or a rehabilitator licensed by the State of California. Should any treated desert tortoises survive, the USFWS would be contacted regarding the final disposition of the animals.
- 10.9 The USFWS may advise the Marine Corps to provide the dead specimens to a laboratory for analysis. The carcass of the deceased tortoise must be kept so the biological material remains intact. When possible, the carcass should be kept on ice or refrigerated (not frozen) until the USFWS has provided information on the appropriate means for disposition.
- 10.10 If such institutions are not available or the shell has been damaged, the information noted in the Reporting Requirements section of the 2002 BO would be obtained and the carcasses left in place. Arrangements regarding the proper disposition of potential museum specimens would be made with the institution by the Marine Corps before implementation of the action.

Desert Tortoise Conservation Efforts (Adapted from 2012 Integrated Natural Resources Management Plan)

- 10.11 Manage TRACRS to protect nests and hatchling tortoises from predation.
- 10.12 Monitor tortoise growth and population changes over time to determine facility success.
- 10.13 Continue non-native predator management.
- 10.14 Minimize MSR and road proliferation.
- 10.15 Continue tortoise awareness program.
- 10.16 Cooperate with other agencies and academic institutions on research conducted on the cause, transmission, testing, and treatment of Upper Respiratory Tract Disease.
- 10.17 Evaluate desert tortoise habitat condition and health.
- 10.18 Identify areas of desert tortoise habitat at risk for negative impacts.
- 10.19 Continue long-term tortoise density and trend-monitoring program using USFWS-approved protocols.

- 10.20 Maintain established study plots.
- 10.21 Monitor long-term study plots on a 2- to 4-year rotation.
- 10.22 Restore disturbed washes to allow for proper functioning.
- 10.23 Maintain and delineate road access to sites to discourage units from making alternate routes.
- 10.24 Identify areas where road upgrades or relocations can benefit both military travel and natural resources conservation. Design projects to enhance these roads, encourage their use, and avoid significant impacts to the desert tortoise, including proper drainage work on shoulders and adequate dry wash crossings.
- 10.25 Restore and rehabilitate Training Lands when economically feasible.
- 10.26 Prevent damage to naturally and culturally sensitive areas by making personnel aware that they are entering sensitive areas.

Desert Tortoise Conservation Measures from the Combat Center Order 5090.4F (Adapted from MAGTF Training Command 2011a)

- 10.27 The possession of otherwise legal captive desert tortoises aboard the Combat Center, including base housing, is prohibited. Under no circumstances are legal captive or wild tortoises from off-base to be released into the Combat Center's population.
- 10.28 The feeding of wildlife on the Combat Center is prohibited. Unauthorized feeding of desert wildlife creates an imbalance in the food chain and reduces the animals' natural fear of humans, which places humans, wildlife, and domestic pets at risk.
- 10.29 The introduction of any exotic plant life is prohibited on the Combat Center.
- 10.30 The release of exotic wildlife, domesticated pets, aquatic species, and those vertebrate and invertebrate species not native to the area is strictly prohibited.
- 10.31 Open fires and the harvesting or cutting of any native vegetation are prohibited.
- 10.32 The "Cleghorn Lakes Wilderness Area," located to the south of the Cleghorn Pass, Bullion, and America Mine Training Areas, is managed by the BLM. Accessing or departing the southeastern ranges through this area by vehicle is strictly prohibited. No vehicle entry is allowed in this protected area. There is no authorized access to the Cleghorn Pass, Bullion, or America Mine Training Ranges from a southerly direction.
- 10.33 The "Ord-Rodman Critical Habitat" for desert tortoise and two associated wilderness areas are adjacent to the Sunshine Peak Training Area. No vehicle entry is allowed in these protected areas.

ES.3.3 Land Use

The following BLM measures would be implemented as part of the proposed action.

- 11. A BLM Minimum Requirements Analysis would be performed whenever project activities would occur in designated wilderness areas.
- 12. During post-translocation monitoring and related activities, Authorized Biologists would identify vehicle staging areas outside designated wilderness areas (using a Global Positioning System to

ensure awareness of wilderness area boundaries), would enter wilderness areas only on foot, and would vary their ingress/egress routes to control areas and sites so as to avoid leaving evidence of a trail or path into designated wilderness areas.

13. Installation of fencing along (but outside of) boundaries of wilderness areas would, to the maximum extent practicable, make use of colored fence posts that blend in with surrounding terrain and thereby minimize visual impact from within the designated areas.
14. The Marine Corps will not install remote tracking devices (e.g., transmitters) on desert tortoises in wilderness areas or wilderness study areas.

ES3.4 Air Quality

Where applicable during project construction, the Combat Center would implement the following:

15. Use water trucks to keep construction areas and commercial helicopter landing sites during translocation damp enough to minimize the generation of fugitive dust.
16. Minimize the amount of disturbed ground area at any given time.

ES.3.5 Cultural Resources

For areas on the Combat Center:

17. The Marine Corps would provide an archaeological monitor to be present for all sign and post emplacement as well as for all trenching for desert tortoise exclusion fencing and the permanent maintenance road. The monitor would ensure that no signs, posts, trenches, or roads would be placed in a manner that would disturb any archaeological site or features.
18. Any new archaeological sites would be recorded and entered into both the NREA's and the State's databases.
19. Construction material laydown areas (located on the new maintenance road) would be restricted to the defined Area of Potential Effect and placement would be monitored by archaeological monitors to ensure that no cultural resources are disturbed.
20. Site CA-SBR-12950 would be flagged and it would be monitored by a NREA-approved archaeologist to ensure that it is not inadvertently disturbed or affected.

For areas on BLM-managed lands:

21. The Marine Corps would survey proposed helicopter landing sites for cultural resources before use. All landing sites would be placed at least 100 ft (30 m) from any cultural resources.
22. Inadvertent Discovery of Human Remains:
 - 22.1 Upon discovery of human remains, all work within a minimum of 200 ft (61 m) of the remains must cease immediately, nothing disturbed, and the area is to be secured. The County Coroner's Office of the county where the remains were located must be called. The Coroner has two working days to examine the remains after notification. The appropriate land manager/owner or the site shall also be called and informed of the discovery.
 - 22.2 Federal land managers/federal law enforcement/federal archaeologists are to be informed as well because of complementary jurisdiction issues. It is very important that the

suspected remains and the area around them remain undisturbed and the proper authorities called to the scene as soon as possible as it could be a crime scene.

- 22.3 The Coroner would determine if the bones are historic/archaeological or a modern legal case.

23. Modern Remains:

- 23.1 If the Coroner's Office determines the remains are of modern origin, the appropriate law enforcement officials would be called by the Coroner and conduct the required procedures. Work would not resume until law enforcement has released the area.

24. Archaeological Remains:

- 24.1 If the Coroner determines the remains are archaeological or historic and there is no legal question, the appropriate Field Office Archaeologist must be called. The archaeologist would initiate the proper procedures under the Archaeological Resources Protection Act and/or Native American Graves Protection and Repatriation Act (NAGPRA). If the remains can be determined to be Native American, the steps as outlined in NAGPRA, 43 CFR 10.4, *Inadvertent Discoveries*, must be followed.

ES.4 OTHER POTENTIAL MITIGATION MEASURES

ES.4.1 Biological Resources

In addition to the SCMs described above, the following additional mitigation measures have been identified to potentially reduce project impacts to biological resources:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil, revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.
- BIO-2. Perching deterrents would be installed on all fence and sign posts that could be used for perching to decrease the threat of raptor and corvid predation on tortoises. Perching deterrents have shown to decrease incidence and length of perching, and as a result, a decrease in predation (Dwyer and Doloughan 2014). Perching deterrents include specifically designed and engineered products, such as Nixalite® bird spikes and Bird-B-Gone bird spiders, and simple home solutions such as driving a nail into the top of a fence post and allowing it to protrude a few inches above the top of the post. These devices could be inspected and repaired or replaced as needed as part of the fence monitoring procedures described in Section 2.1.2.2, *Fencing*.
- BIO-3. The Combat Center would furnish all tortoise exclusion fencing with artificial shade structures and consult with USFWS on the specific design criteria (e.g., location, size).
- BIO-4. The Combat Center would consult with USFWS regarding the appropriate course of action to take for any desert tortoise repeatedly found fence-pacing.
- BIO-5. The Combat Center would develop measures to control coyotes and free-roaming dogs (not be applied in wilderness areas).

ES.4.2 Land Use

In addition to the SCMs described above, the following additional mitigation measure has been identified to potentially reduce project impacts to land use:

- LU-1. Alter the No-Action Alternative to fence only the Exclusive Military Use Area (EMUA) portion of the recipient area in the western portion of the WEA, and only translocate desert tortoises to this smaller fenced area. This potential mitigation measure would eliminate this impact to recreation use.

ES.4.3 Air Quality

Aside from SCMs, no additional mitigation measures have been identified to reduce project impacts to air quality for the No-Action Alternative, Alternative 1, or Alternative 2.

ES.4.4 Cultural Resources

With the application of the SCMs, there are no anticipated impacts to historic properties from implementation of the No-Action Alternative, Alternative 1, or Alternative 2. Accordingly, no additional mitigation measures are needed. Impacts to the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes would be less than significant. Consultation with the Tribes on this issue is ongoing.

ES.5. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

A summary comparison of environmental impacts for the No-Action Alternative and the two action alternatives is presented in Table ES-2.

Table ES-2. Summary and Comparison of Environmental Impacts

Resource	No-Action Alternative	Alternative 1	Alternative 2
Biological Resources	<p>LSI <u>Vegetation</u></p> <ul style="list-style-type: none"> LSI because fence and associated maintenance road construction would impact approximately 122.4 acres (49.5 ha) of desert scrub and 29.6 acres (12 ha) of relatively barren badlands, rock outcrops, and cliffs within the Combat Center (Table 4.1-1). These impact areas represent approximately 0.44% of the total desert scrub and 0.17% of the total badlands, rock outcrops, and cliffs found within the proposed recipient areas, alternate recipient areas, and Special Use Areas under the No-Action Alternative. Implementation of the proposed SCMs would reduce these impacts. <p>LSI <u>Desert Tortoise</u></p> <ul style="list-style-type: none"> LSI because (1) tortoises would have a higher risk of mortality (e.g., from predation or heat), but the increased risk of mortality is small, unquantifiable, not statistically significant compared to that of resident and control tortoises, and is not a driver of desert tortoise mortality following translocation; (2) every alternative includes project features designed to minimize impacts; (3) impacts, including increased stress, would be temporary; (4) population augmentation at the proposed recipient areas would neither push the population over the carrying capacity nor result in a 	<p>LSI <u>Vegetation</u></p> <ul style="list-style-type: none"> LSI because fence and road construction would impact approximately 0.1 acre (0.04 ha) of active and stabilized dune; 24.3 acres (9.8 ha) of badlands, rock outcrops, and cliffs; 68.5 acres (27.7 ha) of desert scrub; and 4.12 acres (1.7 ha) of desert wash within the Combat Center. These impact areas represent approximately 0.07% of the total active and stabilized dune; 0.07% of the total badlands, rock outcrops, and cliffs; 0.07% of the total desert scrub; and 0.13% of the total desert wash found within the proposed recipient and control sites under Alternative 1. <p>LSI <u>Desert Tortoise</u></p> <p>Compared to the No-Action Alternative, Alternative 1 would have the following impacts:</p> <ul style="list-style-type: none"> The use of one, larger constrained dispersal site instead of four smaller sites would have a beneficial impact to the tortoise because it better accommodates tortoise home range size, and could provide results that would better inform future management actions. Translocation of tortoises to areas of depleted populations is even more likely to occur. Headstarting research would be performed. 	<p>LSI <u>Vegetation</u></p> <ul style="list-style-type: none"> LSI because fence and road construction would impact approximately 0.1 acre (0.04 ha) of active and stabilized dune; 20.9 acres (8.5 ha) of badlands, rock outcrops, and cliffs; 64.9 acres (26.3 ha) of desert scrub; and 2.32 acres (0.94 ha) of desert wash within the Combat Center. As described above, the Bullion recipient site would not be established and the Bullion control site would be relocated. Therefore, impact areas would represent approximately 0.29% of the total active and stabilized dune; 0.07% of the total badlands, rock outcrops, and cliffs; 0.07% of the total desert scrub; and 0.09% of the total desert wash found within the proposed recipient and control sites under Alternative 2. <p>LSI <u>Desert Tortoise</u></p> <p>Compared to Alternative 1, Alternative 2 would have the following impacts:</p> <ul style="list-style-type: none"> Density research methodologies would be based on the latest translocation guidance from the USFWS (2016a). As a result, this alternative places greater emphasis on augmenting depleted populations.

Table ES-2. Summary and Comparison of Environmental Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Biological Resources (continued)	<p>population that is unviable; (5) fence construction would adversely affect desert tortoise habitat; (6) tortoises would be translocated less than 124 miles (200 km) to areas that are all located within the same Recovery Unit, and therefore adverse genetic impacts would not occur; (7) handling would create stress in translocated tortoises but these effects would be temporary; and (8) tortoises would experience higher levels of stress and would be exposed to new tortoises as a result of translocation, but precautions would be taken and accepted guidelines would be followed to reduce stress and minimize the risk of spreading disease. In addition, SCMs would be implemented to reduce potential impacts.</p> <ul style="list-style-type: none"> • Benefits would occur because (1) research would be performed that could help improve future management actions to recover the species; (2) increased tortoise density could help desert tortoises spend less energy searching for mates; (3) augmenting the recipient areas would help increase the connectivity at and around the recipient areas; and (4) fence construction would help prevent moderate and heavy impact areas from becoming a population “sink.” 	<ul style="list-style-type: none"> • Insufficient numbers of tortoises with abnormal nasal discharge were found during baseline and clearance surveys to support study of the vertical transmission of disease. As such, Alternative 1 eliminates this potential research from further consideration. • Construction of the fence along the northern edge of the WEA would prevent OHV users from entering this area of the WEA and tortoises from entering the OHV area, thereby protecting the habitat and tortoises within this area. • The Combat Center would implement a predator control program. • The use of helicopters to transport tortoises would greatly reduce the amount of time they are handled as well as the stress associated with long handling periods. • Research on the effects of cattle grazing on desert tortoises may help inform future management actions regarding cattle grazing that could, in turn, have a beneficial impact to tortoises that extends well beyond the study area. • Physical and genetic distance research would help inform degree and timing of assimilation of translocatees with residents, helping measure translocation effectiveness. 	

Table ES-2. Summary and Comparison of Environmental Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Land Use	<p>SI-M <u>Plans and Policies</u></p> <ul style="list-style-type: none"> Significant but mitigable impact because fencing of the proposed recipient area along the western boundary of the WEA would remove OHV access to a portion of the Means Lake Shared Use Area. This would be inconsistent with the intent of the 2014 NDAA and the Johnson Valley OHV Area Management Plan. <p>Potential Mitigation: <i>LU-1, Alter the No-Action Alternative to fence only the EMUA portion of the recipient area in the western portion of the WEA, and translocate desert tortoises to only this smaller fenced area outside the Means Lake Shared Use Area.</i></p> <p>LSI <u>Plans and Policies</u></p> <ul style="list-style-type: none"> Use of most recipient and control areas would be consistent with existing plans and policies, including the Combat Center's INRMP, the 2014 NDAA, San Bernardino County General Plan, CDCA Plan, and West Mojave Plan. <p>LSI <u>Land Ownership Status</u></p> <ul style="list-style-type: none"> Changes in land ownership status would not occur. <p>SI-M <u>Recreation and OHV Use</u></p> <ul style="list-style-type: none"> Same SI-M impact as described above for Plans and Policies, because fencing of the WEA recipient area in the Means 	<p>LSI <u>Plans and Policies</u></p> <ul style="list-style-type: none"> Use of recipient and control sites would be consistent with existing plans and policies, including the Combat Center's INRMP, San Bernardino County General Plan, CDCA Plan, West Mojave Plan, and Johnson Valley OHV Management Plan. <p>LSI <u>Land Ownership Status</u></p> <ul style="list-style-type: none"> Changes in land ownership status would not occur. <p>LSI <u>Recreation and OHV Use</u></p> <ul style="list-style-type: none"> The translocation of desert tortoises and post-translocation monitoring at recipient and control sites would not affect recreation in designated areas such as the Johnson Valley OHV Recreation Area. <p>LSI <u>Grazing</u></p> <ul style="list-style-type: none"> Impacts related to grazing under Alternative 1 would be the same as for the No-Action Alternative. <p>LSI <u>Conservation Areas</u></p> <ul style="list-style-type: none"> The use of helicopters to translocate tortoises would result in negligible noise impacts and helicopters would only land on existing roads, outside of sensitive areas. The plan for translocation of desert tortoises was coordinated with the BLM 	<p>LSI</p> <ul style="list-style-type: none"> Impacts would be essentially the same as described for Alternative 1.

Table ES-2. Summary and Comparison of Environmental Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Land Use (continued)	<p>Lake Shared Use Area would prevent access to an “open use” OHV area.</p> <p>Potential Mitigation: <i>LU-1, Alter the No-Action Alternative to fence only the EMUA portion of the recipient area in the western portion of the WEA, and translocate desert tortoises to only this smaller fenced area outside the Means Lake Shared Use Area.</i></p> <p>LSI <u>Grazing</u></p> <ul style="list-style-type: none"> Land use impacts associated with incompatibility with grazing allotments would be less than significant because grazing of cattle would continue to occur and the total dry matter consumption by translocated tortoises would be less than the equivalent consumption of a single cow. <p>LSI <u>Conservation Areas</u></p> <ul style="list-style-type: none"> Vehicle traffic on BLM-managed lands would be limited to routes that have been designated “open” by BLM. No new roads or cross-country vehicle travel are proposed. Project activities within conservation areas would be compatible with the purposes and management of such areas. <p>LSI <u>Wilderness Areas</u></p> <ul style="list-style-type: none"> Only control areas are proposed in wilderness areas (no tortoise recipient areas). Fencing would be on Combat Center land outside one wilderness area. With the implementation of SCMs 	<p>to ensure that translocation and monitoring is consistent with the management plans for the ACECs and the Mojave Trails National Monument.</p> <p>LSI <u>Wilderness Areas</u></p> <ul style="list-style-type: none"> Under Alternative 1, SCMs described in Section 2.6 would be applied as part of the proposed action and would include a BLM Minimum Requirements Analysis; placing staging areas outside wilderness areas; and varying foot traffic ingress and egress routes to minimize development of trails. Fencing would be on Combat Center land outside one wilderness area. Fence posts adjacent to wilderness areas would be of a color which would blend with the surrounding landscape. All project activities within wilderness areas would be consistent with wilderness management goals, characteristics, and values, so Alternative 1 is expected to result in less than significant impacts to wilderness areas. 	

Table ES-2. Summary and Comparison of Environmental Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Land Use (continued)	described in Section 2.6, all project activities within wilderness areas would be consistent with wilderness management goals, characteristics, and values, so the No-Action Alternative is expected to result in less than significant impacts to wilderness areas.		
Air Quality	LSI <ul style="list-style-type: none"> Estimated construction and operation emissions of all criteria pollutants would be below conformity <i>de minimis</i> limits. Therefore, impacts to air quality would be less than significant. 	LSI <ul style="list-style-type: none"> Impacts would be similar to the No-Action Alternative, and therefore would be less than significant. 	LSI <ul style="list-style-type: none"> Impacts would be similar to the No-Action Alternative, and therefore would be less than significant.
Cultural Resources	LSI <u>Cultural and Spiritual Landscape</u> <ul style="list-style-type: none"> Less than significant impacts to the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes. Consultation with the Tribes on this issue is ongoing. NI <u>Historic Properties</u> <ul style="list-style-type: none"> No impacts anticipated to historic properties due to implementation of SCMs. 	LSI <u>Cultural and Spiritual Landscape</u> <ul style="list-style-type: none"> Impacts would be the same as for the No-Action Alternative. NI <u>Historic Properties</u> <ul style="list-style-type: none"> Impacts would be the same as the No-Action Alternative, with the addition of the use of helicopter landing areas occurring on MSRs or within existing roads/routes. With the implementation of the SCMs, no impacts to historic properties are anticipated due to helicopter landings. 	LSI <u>Cultural and Spiritual Landscape</u> <ul style="list-style-type: none"> Impacts would be the same as for Alternative 1. NI <u>Historic Properties</u> <ul style="list-style-type: none"> Impacts would be the same as Alternative 1.

Legend: ACEC = Area of Critical Environmental Concern; BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; ELISA = Enzyme-Linked Immunosorbent Assay; INRMP = Integrated Natural Resource Management Plan; km = kilometer; LSI = Less than Significant Impacts; MSR = Main Supply Route; NI = No Impact; NDAA = National Defense Authorization Act; OHV = Off-Highway Vehicle; SCM = Special Conservation Measures; SI = Significant Impacts; SI-M = Significant Impacts Mitigable to Less Than Significant; USFWS = U.S. Fish and Wildlife Service; WEA = Western Expansion Area.

ES.6 CUMULATIVE IMPACTS

A summary of potential cumulative impacts under each action alternative is summarized in Table ES-3.

Table ES-3. Summary of Cumulative Impacts

Resource	No-Action Alternative	Alternative 1	Alternative 2
Biological Resources	<p>SI <u>Vegetation</u> Under the No-Action Alternative, a relatively limited acreage of vegetation (less than half of 1% of the project area) would be affected by ground-disturbing activities within the Combat Center (e.g., fence installation and road construction; see Section 4.1.2.1) that, with the implementation of proposed SCMs (Section 2.6), would result in a less than significant impact to vegetation on a project-level basis. However, the past, present, and reasonably foreseeable future actions (particularly renewable energy development projects) described in Section 5.3 would result in significant cumulative impacts to vegetation. No mitigations have been identified to address this impact.</p> <p>SI <u>Desert Tortoise</u> While climate change is not a future action, it is an ongoing phenomenon that would also significantly impact biological resources, also including the desert tortoise and its habitat. Climate change is expected result in a significant impact to biological resources, including the desert tortoise, regardless of where resources are located and even in the absence of other future actions that may also affect these resources. Moreover, it is expected that climate change will require continued, adaptive management to conserve</p>	<p>SI <u>Vegetation</u> Under Alternative 1, a relatively limited acreage of vegetation (less than half of 1% of the project area) would be affected by ground-disturbing activities within the Combat Center (e.g., fence installation and road construction; see Section 4.1.3.1) that, with the implementation of proposed SCMs (Section 2.6), would result in a less than significant impact to vegetation on a project-level basis. However, the past, present, and reasonably foreseeable future actions (particularly renewable energy development projects) described in Section 5.3 would result in significant cumulative impacts to vegetation. No mitigations have been identified to address this impact.</p> <p>SI <u>Desert Tortoise</u> Similar to the No-Action Alternative and as shown on Figure 5-6, under a 1°C increase in summer temperatures, predicted climate change refugia under Alternative 1 are significantly reduced but still occur in a mosaic patchwork throughout the recipient sites shown on Figure 5-5. One exception is the Siberia recipient site, which generally is not predicted to contain tortoise refugia in this climate change scenario. Under a 3°C increase in summer temperatures, predicted climate change refugia are reduced to tiny</p>	<p>SI <u>Vegetation</u> Under Alternative 2, a relatively limited acreage of vegetation (less than half of 1% of the project area) would be affected by ground-disturbing activities within the Combat Center (e.g., fence installation and road construction; see Section 4.1.4.1) that, with the implementation of proposed SCMs (Section 2.6), would result in a less than significant impact to vegetation on a project-level basis. However, the past, present, and reasonably foreseeable future actions (particularly renewable energy development projects) described in Section 5.3 would result in significant cumulative impacts to vegetation. No mitigations have been identified to address this impact.</p> <p>SI <u>Desert Tortoise</u> With respect to cumulative impacts, the only difference between Alternative 1 and Alternative 2 is the removal of the Bullion recipient site. As such, impacts to the desert tortoise and its Alternative 2 would be less than significant on a project-level basis, but the past, present, and reasonably foreseeable future actions described in Section 5.3 would result in significant cumulative impacts. In addition, based on the results from Barrows et al. (2016), climate change is expected to also have a significant impact to the desert</p>

Table ES-3. Summary of Cumulative Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Biological Resources (continued)	sensitive biological resources. No mitigations have been identified to address this impact.	fragments within all recipient sites except the southern portion of the Rodman-Sunshine Peak North recipient site (see Figure 5-7). Based on the results from Barrows et al. (2016), climate change is expected to have a significant impact on biological resources, including the desert tortoise and its habitat, which would be in addition to the significant cumulative impacts that would occur as a result of the past, present, and reasonably foreseeable future actions described in Section 5.3. No mitigations have been identified to address this impact.	tortoise and its habitat that would be in addition to that which would occur as a result of the past, present, and reasonably foreseeable future actions described in Section 5.3. No mitigations have been identified to address this impact.
Land Use	<p>LSI <u>Plans and Policies</u> Under the No-Action Alternative, the fencing of one recipient area in the WEA that overlaps the Shared Use Area would be inconsistent with the intent of the NDAA and the Johnson Valley OHV Area Management Plan, resulting in a significant but mitigable project impact. However, the No-Action Alternative would be consistent with other existing plans and policies, and the project impact to the NDAA and Johnson Valley OHV Management Plan is not indicative of a broader, cumulative impact with regard to these documents. Cumulative impacts related to plans and policies would be less than significant.</p> <p>LSI <u>Land Ownership Status</u> The No-Action Alternative would not result in any change in land ownership status or require any additional land use restrictions. The additive effect of past, present, and</p>	<p>LSI <u>Plans and Policies</u> The proposed tortoise translocation activities under Alternative 1 would be consistent with existing plans and policies, but in conjunction with other past, present, and reasonably foreseeable actions, cumulative impacts related to plans and policies would be less than significant.</p> <p>LSI <u>Land Ownership Status</u> Alternative 1 would not result in any change in land ownership status or require any additional land use restrictions. The additive effect of past, present, and reasonably foreseeable actions on land ownership status (together with Alternative 1) is expected to be less than significant on a regional basis.</p> <p>SI <u>Recreation and OHV Use</u> The proposed translocation of desert tortoises and post-translocation monitoring at recipient and control sites under Alternative 1 would</p>	<p>LSI <u>Plans and Policies</u> The proposed tortoise translocation activities under Alternative 2 would be consistent with existing plans and policies, but in conjunction with other past, present, and reasonably foreseeable actions, cumulative impacts related to plans and policies would be less than significant</p> <p>LSI <u>Land Ownership Status</u> Alternative 2 would not result in any change in land ownership status or require any additional land use restrictions. The additive effect of past, present, and reasonably foreseeable actions on land ownership status (together with Alternative 2) is expected to be less than significant on a regional basis.</p> <p>SI <u>Recreation and OHV Use</u> The proposed translocation of desert tortoises and post-translocation monitoring at recipient and control sites under Alternative 2 would</p>

Table ES-3. Summary of Cumulative Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Land Use (continued)	<p>reasonably foreseeable actions on land ownership status (together with the No-Action Alternative) is expected to be less than significant on a regional basis.</p> <p>SI <u>Recreation and OHV Use</u> The proposed desert tortoise exclusion fence that would surround the recipient area in the WEA under the No-Action Alternative would cut-off OHV access to part of the Means Lake (Shared Use Area) Training Area, resulting in a significant impact to recreation. On a project-level, this impact could be mitigated to be less than significant with implementation of potential mitigation measure LU-1, which would adjust tortoise translocation and fencing to occur only in the exclusive military use area (as described in Section 4.2.2.1). However, cumulative impacts to recreation would continue to be significant because of the additive effect of past, present, and reasonably foreseeable actions, including reductions in land set aside for recreational activities (e.g., the 2012 Final EIS's reduction in Johnson Valley OHV Area), and increases in population that drive larger numbers of people seeking recreational opportunities. No additional mitigations have been identified to address this impact.</p> <p>SI <u>Grazing</u> The Ord-Rodman recipient areas and two control areas are located within the active Ord Mountain Grazing Allotment (cattle). Sufficient forage and access are available in the remaining portions of the Ord Mountain</p>	<p>have a negligible effect on recreation in wilderness areas or the Johnson Valley OHV Recreation Area. However, cumulative impacts to recreation would continue to be significant because of the additive effect of past, present, and reasonably foreseeable actions, including reductions in land set aside for recreational activities (e.g., the 2012 Final EIS's reduction in Johnson Valley OHV Area), and increases in population that drive larger numbers of people seeking recreational opportunities. No mitigations have been identified to address this impact.</p> <p>SI <u>Grazing</u> The Lucerne-Ord and Rodman-Sunshine Peak North recipient sites and the Rodman-Sunshine Peak South control site are located within the active Ord Mountain Grazing Allotment (cattle). Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment. While land use impacts related to incompatibility with grazing are considered to be less than significant at a project level, impacts would be cumulatively significant due to the continuing loss of rural agricultural/grazing lands to other uses including urban development, natural resources development, resource protection and conservation, outdoor recreation, and military uses. No mitigations have been identified to address this impact.</p>	<p>have a negligible effect on recreation in wilderness areas or the Johnson Valley OHV Recreation Area. However, cumulative impacts to recreation would continue to be significant because of the additive effect of past, present, and reasonably foreseeable actions, including reductions in land set aside for recreational activities (e.g., the 2012 Final EIS's reduction in Johnson Valley OHV Area), and increases in population that drive larger numbers of people seeking recreational opportunities. No mitigations have been identified to address this impact.</p> <p>SI <u>Grazing</u> The overlap of Alternative 2 recipient and control sites would be the same as for Alternative 1. Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment for continued cattle grazing. Grazing impacts under Alternative 2 would be similar to the No-Action Alternative, with less than significant impacts to grazing on a project-level basis but cumulatively significant impacts to grazing due to the continuing loss of rural agricultural/grazing lands to other uses including urban development, natural resources development, resource protection and conservation, outdoor recreation, and military uses. Therefore, impacts related to grazing would be cumulatively significant. No mitigations have been identified to address this impact.</p>

Table ES-3. Summary of Cumulative Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Land Use (continued)	<p>Grazing Allotment. While land use impacts related to incompatibility with grazing are considered to be less than significant at a project level, impacts would be cumulatively significant due to the continuing loss of rural agricultural/grazing lands to other uses including urban development, natural resources development, resource protection and conservation, outdoor recreation, and military uses. No mitigations have been identified to address this impact.</p> <p>LSI <u>Conservation Areas</u> Through coordination with the BLM, proposed translocation efforts and post-translocation monitoring at recipient and control areas would be consistent with the management plans for the two ACECs that would overlap the proposed action, and no significant impacts are anticipated. Other cumulative actions would be required to do the same. In addition, other cumulative actions (e.g., Mojave Trails National Monument and the CDCRA and CMORCA) have already designated or will designate new conservation areas in the project area. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.</p> <p>LSI <u>Wilderness Areas</u> As per the evaluation of No-Action Alternative impacts to wilderness areas provided in Section 4.2.2.3, no recipient areas for tortoise translocation would located</p>	<p>LSI <u>Conservation Areas</u> Through coordination with the BLM, translocation efforts (including helicopter use) and post-translocation monitoring at recipient and control sites would be consistent with the management plans for affected ACECs and the Mojave Trails National Monument, and no significant impacts are expected to occur. Other cumulative actions would be required to do the same. In addition, other cumulative actions (e.g., Mojave Trails National Monument and the CDCRA and CMORCA) have already designated or will designate new conservation areas in the project area. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.</p> <p>LSI <u>Wilderness Areas</u> As per the evaluation of Alternative 1 impacts provided in Section 4.2.3.3, impacts of the project to wilderness areas would be less than significant. Fencing would only be installed on Combat Center land outside the boundary of the Cleghorn Lakes Wilderness Area and would be designed for minimal indirect visual impact from within the wilderness area. The periodic research visits by Authorized Biologists to wilderness areas would occur on foot only and would minimize ground disturbance. Three SCMs identified in Section 2.6 would help to ensure that the proposed activities in wilderness</p>	<p>LSI <u>Conservation Areas</u> Through coordination with the BLM, translocation efforts (including helicopter use) and post-translocation monitoring at recipient and control sites would be consistent with the management plans for affected ACECs and the Mojave Trails National Monument, and no significant impacts are expected to occur. Other cumulative actions would be required to do the same. In addition, other cumulative actions (e.g., Mojave Trails National Monument and the CDCRA and CMORCA) have already designated or will designate new conservation areas in the project area. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.</p> <p>LSI <u>Wilderness Areas</u> As per the evaluation of Alternative 2 impacts provided in Section 4.2.4.3, impacts of the project to wilderness areas would be less than significant. Fencing would only be installed on Combat Center land outside the boundary of the Cleghorn Lakes Wilderness Area and would be designed for minimal indirect visual impact from within the wilderness area. The periodic research visits by Authorized Biologists to wilderness areas would occur on foot only and would minimize ground disturbance. Three SCMs identified in Section 2.6 would help to ensure that the proposed activities in wilderness</p>

Table ES-3. Summary of Cumulative Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Land Use (continued)	within wilderness areas or wilderness study areas. The periodic research visits by Authorized Biologists to any control areas located in wilderness areas would occur on foot only and would minimize ground disturbance. Fencing would only be installed on Combat Center land outside the boundary of the Cleghorn Lakes Wilderness Area and would be designed for minimal visual impact from within the wilderness area. Three SCMs have been identified in Section 2.6 (including a BLM Minimum Requirements Analysis) that would help to ensure that the proposed activities in wilderness areas would be consistent with BLM management goals and responsibilities, and that the values/characteristics of wilderness areas would not be diminished by the proposed action. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.	areas would be consistent with BLM management goals and responsibilities, and that the values/characteristics of wilderness areas would not be diminished by the proposed action. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.	areas would be consistent with BLM management goals and responsibilities, and that the values/characteristics of wilderness areas would not be diminished by the proposed action. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.

Table ES-3. Summary of Cumulative Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Air Quality	<p>LSI <u>Criteria Pollutants</u> LSI would occur as a result of the No-Action Alternative because estimated construction and operation emissions of all criteria pollutants would be well below conformity <i>de minimis</i> limits. Therefore, less than significant impacts to air quality would occur.</p> <p>LSI <u>Greenhouse Gases</u> The No-Action Alternative would have a negligible effect on global climate change, since the construction and operation activities would release a nominal amount of GHGs when compared to the total annual CO₂e emissions in the U.S. Other projects in the vicinity of the proposed action (listed in Section 5.3) could also release a nominal amount of GHGs from construction and operation activities; however, with the implementation of SCMs, cumulative impacts from GHGs would be less than significant.</p>	<p>LSI <u>Criteria Pollutants</u> LSI would occur as a result of Alternative 1 because estimated construction and operation emissions of all criteria pollutants would be well below conformity <i>de minimis</i> limits. Therefore, less than significant impacts to air quality would occur.</p> <p>LSI <u>Greenhouse Gases</u> Alternative 1 would have a negligible effect on global climate change, since the construction and operation activities would release a nominal amount of GHGs when compared to the total annual CO₂e emissions in the U.S. Other projects in the vicinity of the proposed action (listed in Section 5.3) could also release a nominal amount of GHGs from construction and operation activities; however, with the implementation of SCMs, cumulative impacts from GHGs would be less than significant.</p>	<p>LSI <u>Criteria Pollutants</u> LSI would occur as a result of Alternative 2 because estimated construction and operation emissions of all criteria pollutants would be well below conformity <i>de minimis</i> limits. Therefore, less than significant impacts to air quality would occur.</p> <p>LSI <u>Greenhouse Gases</u> Alternative 2 would have a negligible effect on global climate change, since the construction and operation activities would release a nominal amount of GHGs when compared to the total annual CO₂e emissions in the U.S. Other projects in the vicinity of the proposed action (listed in Section 5.3) could also release a nominal amount of GHGs from construction and operation activities; however, with the implementation of SCMs, cumulative impacts from GHGs would be less than significant.</p>

Table ES-3. Summary of Cumulative Impacts (continued)

Resource	No-Action Alternative	Alternative 1	Alternative 2
Cultural Resources	<p>SI <u>Cultural and Spiritual Landscape</u> With respect to impacts on the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes, the SEIS analysis found less than significant impacts related to the implementation of the No-Action Alternative. Although the impacts from the No-Action Alternative are less than significant, they do contribute to the aggregate effects of other past, present, and foreseeable future actions on this landscape, which are cumulatively significant. Should the actions implemented as part of the 2011 GTP Plan (No-Action Alternative) result in higher densities and better health of the regional tortoise population, the impacts of the proposed action would be beneficial and counteract some of the aggregate negative impacts.</p> <p>NI <u>Prehistoric and Historic Sites</u> With the implementation of SCMs, there would be no impacts to historic properties. Therefore, the proposed action would not contribute to the cumulative loss of historic properties in the region of influence for the proposed action.</p>	<p>SI <u>Cultural and Spiritual Landscape</u> Same as the No-Action Alternative.</p> <p>NI <u>Prehistoric and Historic Sites</u> Same as the No-Action Alternative.</p>	<p>SI <u>Cultural and Spiritual Landscape</u> Same as the No-Action Alternative.</p> <p>NI <u>Prehistoric and Historic Sites</u> Same as Alternative 1.</p>

Legend: °C = degrees Celsius; ACEC = Area of Critical Environmental Concern; BLM = Bureau of Land Management; CDCRA = California Desert Conservation and Recreation Act; CMORCA = California Minerals, Off-Road Recreation, and Conservation Act; CO₂e = carbon dioxide equivalent; EIS = Environmental Impact Statement; GHG = Greenhouse Gas; GTP = General Translocation Plan; LSI = Less than Significant Impacts; NDAA = National Defense Authorization Act; NI = No Impact; OHV = Off-Highway Vehicle; SCM = Special Conservation Measures; SEIS = Supplemental Environmental Impact Statement; SI = Significant Impacts

Draft

**Supplemental Environmental Impact Statement for Land Acquisition and Airspace
Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and
Maneuver Training, Marine Corps Air Ground Combat Center,
Twentynine Palms, CA**

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ACRONYMS AND ABBREVIATIONS

%	percent
°C	degrees Celsius
°F	degrees Fahrenheit
µg/m ³	microgram per cubic meter
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
BA	Biological Assessment
BI	Beneficial Impact
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CA-247	California State Route 247
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CDCA	California Desert Conservation Area
CDFW	California Department of Fish and Wildlife
CDCRA	California Desert Conservation and Recreation Act
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH ₄	Methane
CI	Condition Index
cm	centimeter(s)
CMORCA	California Minerals, Off-Road Recreation, and Conservation Act
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DNA	Deoxyribonucleic Acid
DON	Department of the Navy
DRECP	Desert Renewable Energy Conservation Plan
EA	Environmental Assessment
EIS	Environmental Impact Statement
ELISA	Enzyme-Linked Immunosorbent Assay
EMUA	Exclusive Military Use Area
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ft	foot/feet
FONSI	Finding of No Significant Impact
FY	Fiscal Year
g/cm ³	grams per cubic meter
GAP	Gap Analysis Program
GHG	Greenhouse Gas
GIS	Geographic Information System
GTP	General Translocation Plan
ha	hectare(s)

ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPT	Integrated Products Team
ISEGS	Ivanpah Solar Electric Generating System
km	kilometer
km ²	square kilometer
LSI	Less Than Significant Impact
m	meter(s)
MAGTF	Marine Air Ground Task Force
MBTA	Migratory Bird Treaty Act
MCAGCC	Marine Corps Air Ground Combat Center
MCCES	Marine Corps Communication and Electronic School
MDAB	Mojave Desert Air Basin
MEB	Marine Expeditionary Brigade
mg/m ³	Milligrams Per Cubic Meter
MSR	Main Supply Route
NA	Not Applicable
N ₂ O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAVFAC SW	Naval Facilities Engineering Command Southwest
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NI	No Impact
NO ₂	Nitrogen Dioxide
NOI	Notice of Intent
NO _x	Nitrogen Oxides
NREA	Natural Resources and Environmental Affairs
NRHP	National Register of Historic Places
O ³	Ozone
OHV	Off-Highway Vehicle
PM _{2.5}	Particulate Matter Less Than or Equal to 2.5 Microns in Diameter
PM ₁₀	Particulate Matter Less Than 10 Microns in Diameter But Greater Than 2.5 Microns in Diameter
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
QA/QC	Quality Assurance/Quality Control
RMG	Resource Management Group
ROD	Record of Decision
RTA	Range Training Area
SCM	Special Conservation Measure
SEA	Southern Expansion Area
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office(r)
SI	significant impact
SI-M	Significant Impact Mitigable to Less Than Significant
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
TPWD	Twentynine Palms Water District
TRACRS	Tortoise Research and Captive Rearing Site
U.S.	United States

USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
WEA	Western Expansion Area
WMRNP	West Mojave Route Network Project

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CHAPTER 1

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

This chapter provides background information and describes the purpose of and need for the proposed action evaluated in this Supplemental Environmental Impact Statement (SEIS) for Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force (MAGTF) Live-Fire and Maneuver Training, Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California (hereinafter the “Combat Center”).

1.1 INTRODUCTION

In February 2013, the Department of the Navy (DON) signed a Record of Decision (ROD) based on the 2012 Final Environmental Impact Statement (EIS) for *Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training* (DON 2012) (hereinafter the “2012 Land Acquisition/Airspace Establishment EIS” or “2012 Final EIS”). The 2013 ROD documented the DON’s decisions regarding establishment of a large-scale MAGTF training facility at the Combat Center. The purpose of the proposed action in the 2012 Final EIS was to accommodate sustained, combined-arms, live-fire, and maneuver training for all elements of a Marine Expeditionary Brigade (MEB)-sized MAGTF. The action was needed because existing facilities, ranges, and live-fire ground and air maneuver areas were inadequate to support the Marine Corps’ requirement for MEB-level training exercises. The 2012 Final EIS and 2013 ROD can be downloaded at the [G-4 Installations and Logistics Land Acquisition/Airspace Establishment Study website](http://www.29palms.marines.mil/Staff/G4-Installations-and-Logistics/Land-Acquisition/) (<http://www.29palms.marines.mil/Staff/G4-Installations-and-Logistics/Land-Acquisition/>).

A General Translocation Plan (GTP) for Desert Tortoises (MCAGCC 2011; see also Appendix A) was prepared in support of the 2012 Final EIS and its Biological Assessment (BA) (hereinafter the “Land Acquisition BA”). The intent of the GTP was to provide for the translocation of tortoises from training areas in the proposed Western Expansion Area (WEA) and Southern Expansion Area (SEA) (Figure 1.1-1) that would experience high to moderate levels of impact from the proposed training activities, and to recommend further investigation of those factors that would be important determinants of translocation success and tortoise recovery. In July 2012, the United States (U.S.) Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) (hereinafter “2012 Land Acquisition BO” or “Land Acquisition BO”) that identified conservation and mitigation measures the Marine Corps would need to implement to minimize the rate of mortality or injury to resident Agassiz’s desert tortoises (*Gopherus agassizii*) (hereinafter “desert tortoise”), including developing a detailed plan to translocate desert tortoises from areas that would experience impacts from training. Since the 2012 Final EIS and 2013 ROD, the Marine Corps has conducted detailed studies and has worked with USFWS and the Bureau of Land Management (BLM) to refine the translocation plan for the desert tortoise, as required in the 2012 Land Acquisition BO. As a result of this effort, and in consultation with the USFWS, the Combat Center refined and developed two alternative desert tortoise translocation plans (MCAGCC 2016b, c; see also Appendix A).

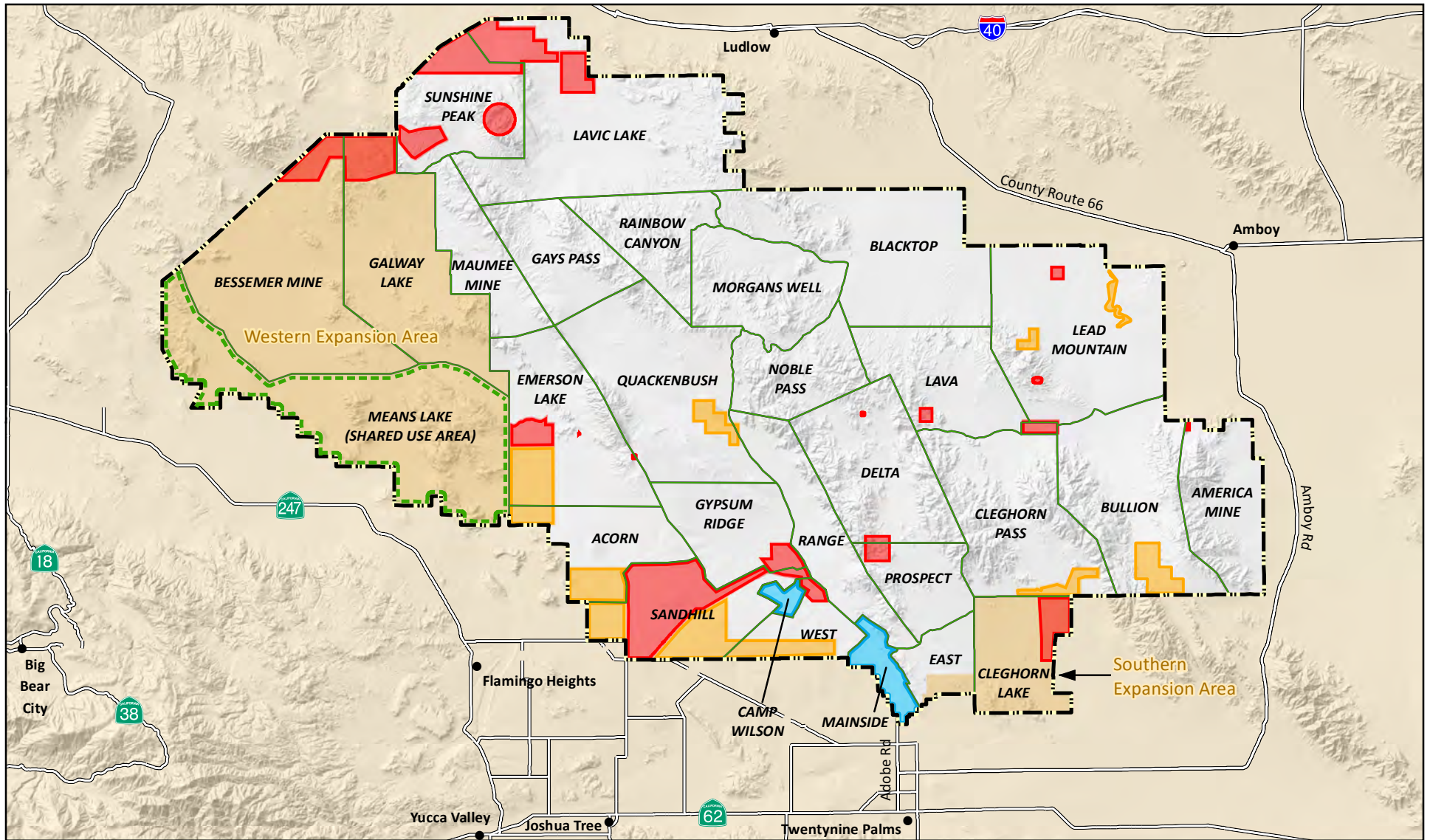


Figure 1.1-1. Regional Location and Training Areas of the Combat Center, Twentynine Palms



In light of new information gained from these efforts, the DON elected to prepare an SEIS focused on the evaluation of potential environmental impacts associated with alternative tortoise translocation plans. The DON issued its Notice of Intent (NOI) to prepare the SEIS on August 24, 2016 (81 Federal Register 57891) (see Appendix B). In the NOI, the DON identified two potential action alternatives and a No-Action Alternative for the translocation of desert tortoise from training impact areas. Under the No-Action Alternative, the Marine Corps would conduct translocation of desert tortoises per the Land Acquisition BO at several recipient and control general areas and identify translocation methods, post-translocation monitoring, and other research that would provide important information on desert tortoise recovery methods. Alternatives 1 and 2 primarily differ from the No-Action Alternative in the size, number, and location of recipient and control areas. Compared to the No-Action Alternative, Alternatives 1 and 2 would include additional research studies and reflect updated information obtained from the post-2013 ROD 3-year program of surveys. Alternative 2 differs from Alternative 1 in that one less recipient site would be used, pairing of control sites to one recipient site would be different, the Bullion control site would be located on the Combat Center instead of within the Cleghorn Lakes Wilderness Area, and experimental translocation densities would be different.

1.2 SCOPE OF THIS SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

The DON prepared this SEIS in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] §§ 4321, et seq.); the Council on Environmental Quality's (CEQ's) implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), DON procedures for implementing NEPA (32 CFR Part 775); and Marine Corps Order P5090.2A, Change 3, dated 26 August 2013, *Environmental Compliance and Protection Manual*. Pursuant to 40 CFR § 1502.9, the DON prepared this SEIS for the purpose of supplementing the portions of the 2012 Land Acquisition/Airspace Establishment EIS regarding protection of the desert tortoises via implementation of a successful desert tortoise translocation program. Pursuant to 40 CFR § 1502.9(c)(4), the DON will prepare, circulate, and file the SEIS in the same fashion (exclusive of scoping) as it did the draft and 2012 Final EIS. By supplementing the 2012 Final EIS, this SEIS advances NEPA's purpose of informing decision-makers and the public about the environmental effects of the DON's proposed action and alternatives. This SEIS will also provide analysis necessary to support BLM issuing a ROD authorizing release of desert tortoises on BLM-administered lands.

Pursuant to 40 CFR § 1502.21, this SEIS incorporates by reference the entire 2012 Land Acquisition/Airspace Establishment EIS and the 2013 ROD. This SEIS focuses on potential alternative methodologies and locations for implementing a desert tortoise translocation program in conjunction with the MAGTF training facility and MEB-sized training exercises. These alternative translocation plans reflect the additional detailed tortoise surveys and other research efforts that the Marine Corps has conducted since the 2011 GTP.

1.3 BACKGROUND

1.3.1 Overview of the 2012 Environmental Impact Statement

The 2012 Land Acquisition/Airspace Establishment EIS examined the potential environmental effects associated with the proposed establishment of a large-scale training range facility at the Combat Center that would accommodate sustained, combined-arms, live-fire, and maneuver training for all elements of a MEB, including large-scale MEB exercises involving three battalion task forces and associated MEB Building Block training for participating units up to a single battalion task force. To implement the

proposed action, the Marine Corps required additional land adjacent to the existing Combat Center, the establishment and modification of military Special Use Airspace above the proposed MEB-sized training range, and the implementation of the specified MEB training operations.

The 2012 Final EIS examined six action alternatives and the No-Action Alternative. Each of the six action alternatives featured land acquisition, airspace modification/establishment, and operational components. Some of these components were the same across different alternatives. Three of the alternatives included a Restricted Public Access Area to allow civilian recreational use when military training activities were not being conducted. Under all alternatives, established airspace was to be returned to Federal Aviation Administration control to be made available for commercial and general aviation when not being used by the Marine Corps. Land acquisition under each action alternative involved up to two “acquisition study areas” out of three such areas (titled in the EIS as “west study area,” “east study area,” and “south study area”) identified for potential acquisition (*Note: the expansion areas were originally called “Study Areas” and “Acquisition Areas” in the 2012 Land Acquisition/Airspace Establishment EIS, but for purposes of this SEIS, all are now called “Expansion Areas”*). One alternative (Alternative 5) involved land acquisition in only one of the three expansion areas. None of the action alternatives involved land acquisition in all three expansion areas. The land acquisition was to be accomplished via Congressional withdrawal of public lands and purchase of private and State-owned lands. All six alternatives included the translocation of tortoises.

1.3.2 Overview of the 2013 Record of Decision

After evaluating public and agency comments on the 2012 Final EIS and considering the 2012 Final EIS along with costs and mission training requirements, the Principal Deputy Assistant Secretary of the Navy (Energy, Installations and Environment) signed the ROD on February 11, 2013. The 2013 ROD selected Alternative 6 as the preferred alternative to meet MEB training requirements, with additional mitigation recommended by the BLM, a cooperating agency in the development of the EIS, following publication of the Final EIS. Alternative 6 was not the best alternative from a training perspective, nor was it the best from an environmental perspective. It was the preferred alternative because it was the optimal alternative considering operational and environmental impact factors together. Alternative 6 had been developed in response to public comments provided during scoping and on the Draft EIS and designed to preserve public access to important off-highway recreation areas during periods when MEB training did not require use of that land.

The additional mitigation measures recommended by BLM and agreed to in the 2013 ROD included:

- The Shared Use Area (discussed as the Restricted Public Access Area in the 2012 Final EIS, and referred to as the Shared Use Area throughout the 2013 ROD) would be expanded by approximately 5,000 acres (2,000 hectares [ha]) in the southwest corner of the west study area, and the Exclusive Military Use Area (EMUA) correspondingly decreased in size. This minor expansion of the Shared Use Area would better accommodate public access between the western and southeastern parts of Johnson Valley. This area is routinely used by off-highway vehicles (OHVs) and has low densities of desert tortoise. In the Shared Use Area, only non-dud producing ordnance would be used, meaning that a misfire or other failure to function as designed would not yield a “dud” that might detonate unexpectedly.
- The BLM, rather than the Marine Corps, would manage the Shared Use Area primarily for recreation during the 10 months of the year when the area will be open to public access. The

Marine Corps would manage the area primarily for military purposes during the two 30-day periods that the area will be used for military training (i.e., MEB exercises).

- The two recreation mitigation measures (REC-1 and REC-2) presented in the Final EIS would be implemented with minor administrative modifications. The Marine Corps and BLM would establish a Resource Management Group (RMG) to address all issues associated with the Shared Use Area and would implement an effective community/public outreach plan to ensure the public is given every opportunity to understand the change in land use and potential dangers. Further, consideration would still be given to the potential use of portions of the EMUA for limited, controlled access on a case-by-case basis for organized OHV race events.

Withdrawal and reservation of public lands in excess of 5,000 acres (2,000 ha) for military training purposes can only be enacted through Congressional action. As part of the 2012 Final EIS proposed action, the DON prepared legislation to withdraw and reserve approximately 154,000 acres (62,000 ha) of public lands for military training purposes (see Section 1.3.3 for discussion of this legislation).

The 2013 ROD committed the Marine Corps to implementing resource-specific mitigation measures and monitoring. Those specific to the desert tortoise included the following measures from the 2012 Land Acquisition BO issued by the USFWS. The following measures would extend to the withdrawn and purchased lands to partially offset impacts to desert tortoises. The full text of these measures is provided in the 2012 Land Acquisition BO, which also includes other mitigation measures to further offset the impacts that are expected to result from implementation of the Selected Alternative.

- ***New Special Use Areas:*** As part of this measure, the Marine Corps committed to establishing two Category 1 (restricted) Special Use Areas in the WEA (12,015 acres [4,862 ha] combined) and one Category 1 (restricted) Special Use Area in the SEA (2,935 acres [1,188 ha]). These Special Use Areas are areas that have not been identified as part of the training scenarios but that contain habitat supporting moderate densities of desert tortoises. Two of these Special Use Areas are adjacent to existing protected areas (i.e., Ord-Rodman Area of Critical Environmental Concern [ACEC] [adjacent to the WEA] and Cleghorn Lakes Wilderness Area [adjacent to the SEA]). The third is located in the western portion of the WEA and is not contiguous with existing or proposed conservation areas. The Marine Corps committed to placing all newly established Special Use Areas off-limits to mechanized maneuvers, OHV travel, bivouac sites, and any other military training involving OHV activity. The Marine Corps committed to signing these Special Use Areas, and fencing them on the sides near proposed maneuver areas and the Johnson Valley OHV Area, to reduce the potential for effects from training activities and unauthorized access. Some Special Use Areas will serve as recipient sites for desert tortoises translocated from maneuver corridors and training objectives within the expansion areas (see below). The Marine Corps committed to also creating a new Category 1 (restricted) Special Use Area within the Sunshine Peak Training Area (1,987 acres [804 ha]) and managing an existing Special Use Area within the Sunshine Peak and Lavic Lake Training Areas (8,902 acres [3,602 ha]) to increase the protection of desert tortoises within the boundaries of the existing Combat Center. This represents a combined size of 25,839 acres (10,457 ha) of new Special Use Areas. It should be noted that, compared to earlier documents (e.g., the 2012 Land Acquisition BO and the 2013 ROD) the acreages reported herein have been updated based on review of Geographic Information System (GIS) data. Specifically, the acreage reported for the Sunshine Peak and Lavic Lake Training Areas (8,902 acres [3,602 ha]) was increased by 1 acre (0.40 ha) by

correcting for rounding error, and the combined size was decreased 5 acres (2 ha) by correcting for summation error.

- **Translocation Program:** The Combat Center committed to translocating tortoises from heavy and moderate disturbance areas before the first MEB exercise. As part of this measure, the Marine Corps committed to performing extensive pre-translocation surveys of potential recipient sites to provide information that may be critical to the final translocation plan developed by the Marine Corps and USFWS. If changes to the MEB objective or other training-related disturbances cause an effect to the desert tortoise that the USFWS had not considered in the Land Acquisition BO, or if the effects are greater than those anticipated by the Land Acquisition BO, the Marine Corps may need to modify the translocation plan and re-initiate consultation. As part of this translocation plan, the Marine Corps committed to providing increased law enforcement in all areas. It committed to also constructing tortoise fencing or other barriers to restrict movement of desert tortoises back into heavy or moderate disturbance areas.
- **Desert Tortoise “Headstarting” and Population Augmentation:** The Marine Corps committed to developing and integrating population augmentation strategies into translocation and monitoring efforts. As part of this measure, the Marine Corps committed to implementing research on population augmentation within designated Special Use Areas and/or other recipient sites for translocation. The Marine Corps committed to coordinating with the USFWS in development of the population augmentation strategy and covering this work under its existing section 10(a)(1)(A) recovery permit.
- **Monitoring:** Monitoring will occur over 30 years to ascertain the long-term effects of translocation and augmentation upon resident, translocated, control, and headstarted tortoises. Results of translocation and monitoring efforts will be reported annually to USFWS, and other agencies and interested parties. This monitoring will be done via health assessments and electronic tracking by expert biologists.

The 2012 Land Acquisition BO included a set of Reasonable and Prudent Measures intended to further minimize the impacts of implementing the Preferred Alternative. These additional measures and associated Terms and Conditions are listed below.

Reasonable and Prudent Measures

The Marine Corps will ensure:

1. That the rate of mortality or injury of translocated and resident desert tortoises is not elevated above the rate of mortality or injury for other populations within the action area that are not affected by translocation.
2. That the level of incidental take anticipated in the Land Acquisition BO is commensurate with the analysis contained therein.

Terms and Conditions

The following term and condition implements Reasonable and Prudent Measure 1:

- If monitoring of translocated and recipient site desert tortoises indicates a statistically significant elevation in mortality rates above that observed in the control population, the Marine Corps must request re-initiation of consultation on the proposed action.

The following term and condition implements Reasonable and Prudent Measure 2:

- The Marine Corps will re-initiate formal consultation with the USFWS if:
 - a) Ten individuals of any size are injured or killed during the translocation of desert tortoises from the acquisition areas. This number is only for desert tortoises that might be injured or killed during the process of moving them between the acquisition and translocation areas; the recovery permit for post-translocation monitoring and research will address injury and mortality associated with that work.
 - b) Twenty desert tortoises of any size are killed or injured in any calendar year as a result of training and preparation work for training within the expanded boundaries of the Combat Center (i.e., the acquisition areas and the former boundaries).

1.3.3 Overview of the National Defense Authorization Act

Enacted in December 2013, the National Defense Authorization Act of 2014 (NDAA) authorized the withdrawal of federal land and purchase of non-federal land to meet MEB training requirements at the Combat Center. The legislation modified the Selected Alternative in the 2013 ROD to enable the Marine Corps to conduct MEB level live-fire training while also preserving more land to be available for recreation in the Shared Use Area from the original approximately 43,000 proposed acres (17,400 ha) to approximately 53,000 acres (21,400 ha), and expanded the base by 98,000 acres (39,700 ha) for EMUA west and south of the Combat Center. The 53,000 acre (21,400 ha) Shared Use Area will be available for public recreation 10 months per year and for military training during two 30-day periods each year. The legislation also designated approximately 43,000 acres (17,400 ha) as the Johnson Valley OHV Recreation Area for year-round public recreation.

The NDAA also established the RMG, a partnership between the BLM and the Marine Corps, to (1) manage the Shared Use Area, (2) develop and implement a public outreach plan, and (3) draft an Implementation Plan. The RMG is developing and implementing a public outreach plan to inform the public of the land use changes and safety restrictions affecting the EMUA and Shared Use Area. The RMG meets at least once a year and solicits input from relevant stakeholders relating to the management and facilitation of recreational use within the Shared Use Area. The EMUAs west and south of the Combat Center are managed by the Marine Corps.

1.3.4 Overview of Desert Tortoise Translocation in Support of Land Acquisition

The Land Acquisition BA (DON 2011) identified that the desert tortoise, a federally and state-listed threatened species, is likely to be adversely affected by the MEB training in the WEA and SEA. The USFWS issued the Land Acquisition BO (USFWS 2012) in response to the Land Acquisition BA (DON 2011). Several conservation actions were recommended in the Land Acquisition BA, and approved in the Land Acquisition BO, among them a plan to translocate tortoises from medium- and high-intensity MEB operating areas in the WEA and SEA (Figure 1.3-1) before training exercises. High-intensity battle activity (i.e., likely to result in high-intensity disturbance) would occur in the more level, gently sloping terrain of the project area. While steeper and rockier areas would likely be subject to less disturbance (typically medium- or low-intensity disturbance), certain vehicles and equipment would be used to fight from covered terrain, such as rocks and reverse slopes of hills that provide cover. Wheeled re-supply and other vehicles would regularly use the Main Supply Routes (MSRs) in the project area during training.

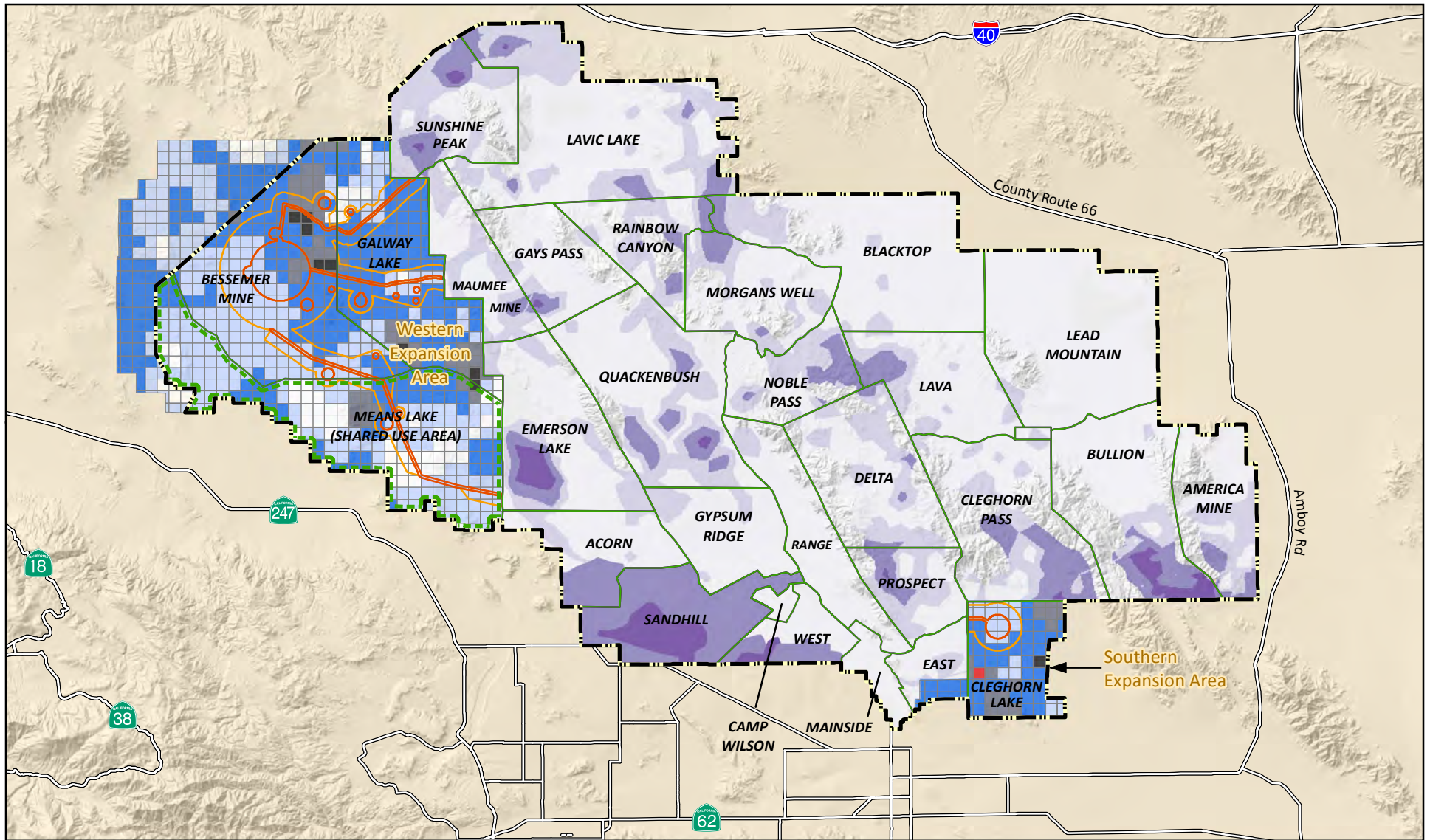
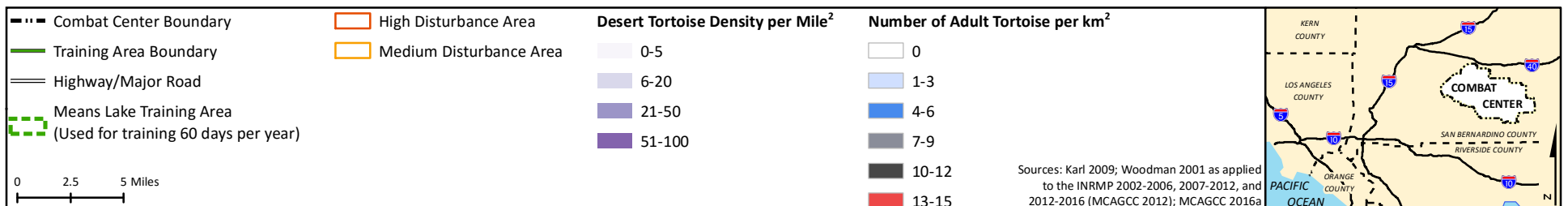


Figure 1.3-1. Estimated Disturbance to Desert Tortoise Habitat under the Land Acquisition EIS Proposed Action



The 2011 GTP found that because military training in the expansion areas would not be compatible with the continued existence of tortoises in the medium- and high-intensity MEB operating areas, translocation is necessary to support the continued existence of this population by maintaining tortoise abundance and genetic integrity. If not translocated, an estimated 1,105 adult tortoises and potentially 2,100 juveniles would be lost from these zones of the WEA and SEA due to the intensity of training exercises (DON 2011). Such a loss of desert tortoises and tortoise habitat would not be compatible with recovery of this threatened species (DON 2011). Long-term monitoring of the translocation efforts for this large cohort of tortoises would provide valuable information on translocation efficacy as a tool for species recovery. Studies that can be completed ancillary to translocation would provide important information for recovery methods. Such monitoring and studies are consistent with strategies outlined in the revised desert tortoise Recovery Plan (USFWS 2011a).

The purpose of the 2011 GTP was to provide for translocating tortoises from the training areas in the WEA and SEA, and an approach for further investigation of those factors that are important for implementing translocation and are likely to influence translocation success and tortoise recovery. The 2011 GTP identified anticipated details of translocation, based on (1) information in the Land Acquisition BA and 2012 Final EIS about project activities, and (2) available information on the conditions in those areas involved in the translocation program (recipient and control areas). Also included was an approach for collecting further data in the following 3 years that would provide more detailed information than was available at the time. The Combat Center has since conducted a 3-year program of surveys, literature review, and consultation with resource agencies, resulting in the preparation of a desert tortoise translocation plan in March 2016 (Appendix A; MCAGCC 2016b), which was further developed in June 2016 (Appendix A; MCAGCC 2016c).

1.4 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action evaluated in this SEIS is to study alternative translocation plans in support of the project that was described in the 2012 Land Acquisition/Airspace Establishment EIS, selected in the 2013 ROD, and authorized by the Fiscal Year (FY) 2014 NDAA. The 2011 GTP (MCAGCC 2011), developed during the section 7 Endangered Species Act (ESA) consultation on the 2012 Final EIS proposed action, identified proposed recipient areas, translocation methods, and research treatments based on information available at the time of publication. Studies were conducted over the following 3 years to provide information necessary to refine these areas, methods, and treatments. The 2011 GTP explicitly recognized that as a result of these studies, the Combat Center could refine these areas to specific sites and determine better recipient sites not considered in the 2011 GTP. The results of these efforts, and further consultation with USFWS and California Department of Fish and Wildlife (CDFW), identified refinements to translocation methods, recipient sites, and research treatments that could better support the goals of the translocation effort (and became the basis for the action alternatives considered in this SEIS). The alternative selected in the ROD for the SEIS will be implemented prior to conducting the sustained, combined-arms, live-fire, and maneuver field training for MEB-sized MAGTFs contemplated in the 2012 Final EIS.

The Marine Corps needs to implement the proposed action to satisfy requirements identified in the 2012 Final EIS and associated Land Acquisition BO. The 2012 Land Acquisition BO concluded that the implementation of the Preferred Alternative would likely result in the “take” of desert tortoises associated with military training, tortoise translocation efforts, and authorized and unauthorized OHV use by recreationists displaced from former areas of the Johnson Valley OHV Area.

The 2013 ROD committed the Marine Corps to the following measures from the 2012 Land Acquisition BO issued by the USFWS (see Section 1.3.2 for additional details on these measures):

- Establish new Special Use Areas (areas that have not been identified as part of the training scenarios and that contain habitat supporting desert tortoises);
- Translocation Program;
- Desert Tortoise Headstarting and Population Augmentation; and
- Monitoring.

1.5 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

1.5.1 Agency Consultation and Coordination

The DON is the action proponent and is the lead agency for the preparation of this SEIS. BLM will participate as a cooperating agency for the SEIS. As defined in 40 CFR §1508.6, a cooperating agency is any Federal agency that has jurisdiction by law or special expertise with respect to any environmental issue that should be addressed in the SEIS. Cooperating agency responsibilities include participating in the NEPA process at the earliest possible time and developing information and preparing environmental analyses concerning relevant domains in which the cooperating agency has special expertise.

BLM's inclusion as a cooperating agency in development of this SEIS is based on its current jurisdiction by law and special expertise over several translocation recipient sites. The BLM has unique knowledge of the public lands under its jurisdiction and has the expertise essential to help the DON evaluate parcels of land proposed to receive translocated desert tortoises. This SEIS will also provide analysis necessary to support the BLM issuing a ROD authorizing release of desert tortoises on BLM-administered lands.

In addition to evaluation under NEPA, the proposed action is subject to other federal laws and regulatory requirements. Therefore, the DON is consulting and/or coordinating with the USFWS, CDFW, California State Historic Preservation Office (SHPO), and others on the proposed action. In addition, government-to-government consultation is being conducted with Native American Indian Tribes and Nations.

Consultation with USFWS informed the development of the desert tortoise translocation plans (Appendix A; MCAGCC 2016b, c), and an updated BO is anticipated in October of 2016.

1.5.2 Notice of Intent

The DON published a NOI to prepare this SEIS on August 24, 2016 (Appendix B). This notice set forth the DON's intent to supplement the 2012 Land Acquisition/Airspace Establishment EIS and to evaluate the potential effects of the proposed modifications made to the 2011 GTP for Desert Tortoises.

1.6 ORGANIZATION OF THE SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

Chapter 1 of this SEIS introduces some background information and describes the purpose and need for the proposed action. Chapter 2 describes the proposed action and alternatives considered. Chapter 3 describes the environment potentially affected by the proposed action for resources that are assessed in detail, and explains why some resources were considered but eliminated from further discussion in this SEIS. Chapter 4 analyzes the environmental consequences of each alternative. Chapter 5 describes the cumulative effects of the proposed action in conjunction with other past, present, and reasonably foreseeable future projects in the area. Chapter 6 discusses other considerations required by NEPA, and Chapter 7 identifies the references used in preparation of the SEIS. Finally, Chapter 8 lists the persons and agencies contacted and Chapter 9 presents a list of SEIS preparers and contributors.

CHAPTER 2

PROPOSED ACTION AND ALTERNATIVES

This chapter describes in detail the three alternatives that are evaluated in this SEIS. Section 2.1 describes the No-Action Alternative, which would implement the 2011 GTP that was considered in the 2012 Land Acquisition BO. Sections 2.2 and 2.3 describe Alternatives 1 and 2, respectively, while Section 2.4 presents a summary comparison of the alternatives. Section 2.5 describes alternatives that were considered but eliminated from inclusion in this SEIS, and Section 2.6 summarizes the special conservation measures (SCMs) that would be implemented as part of the proposed action.

2.1 NO-ACTION ALTERNATIVE

The No-Action Alternative is the implementation of the translocation plan considered in the 2012 Land Acquisition/Airspace Establishment EIS and associated 2012 Land Acquisition BO, and selected as a mitigation measure in the 2013 ROD. It is the manner in which the Marine Corps would proceed absent the refinements to the translocation plan described in Alternatives 1 and 2.

Under the No-Action Alternative, the Marine Corps would conduct translocation of desert tortoises at recipient areas as identified in the 2011 GTP (Appendix A). This alternative is described in detail below.

2.1.1 Recipient and Control Areas

2.1.1.1 Recipient Areas and Control Areas Selection Criteria

The 2011 GTP (Appendix A) identified the following criteria for selection of recipient areas that should be met for successful translocation to occur:

- Translocation lands should be part of a larger block of lands that are either already protected or planned for protection, or feasibly could be protected by a public resource agency or a private biological-reserve organization. The recipient areas would be managed for conservation so that potential threats from future impacts are precluded.
- Recipient areas should be connected to occupied desert tortoise habitat or in sufficiently close proximity to known occupied tortoise habitat that unencumbered genetic flow is possible.
- Preferably, tortoise populations on and/or near the recipient areas are depleted or depressed, so that translocation repatriates a formerly occupied site and does not conflict with carrying capacity constraints. The lands must comprise sufficiently good habitat that they are either currently occupied or could be occupied by the desert tortoise once they are protected from anthropogenic impacts and/or otherwise enhanced.
- Habitat on the recipient areas should be suitable for all life stages.
- Recipient areas should not be subject to such intensive recreational (OHV), grazing, or other uses that habitat recovery would be rendered unlikely or lengthy. Nor should those invasive species that are likely to jeopardize habitat recovery (e.g., Sahara mustard [*Brassica tournefortii*]) be present in uncontrollable numbers, either on or immediately adjacent to the parcels under consideration.
- Recipient areas must have no detrimental rights-of-way or other encumbrances.

- Control areas must be similar to recipient areas (e.g., habitat type/quality, post-translocation population density, and disease status), but not influenced by translocation to recipient areas. USFWS (2011b) recommends a separation distance of approximately 6.25 miles (10 km).

These criteria are consistent with the goals, objectives, and recovery strategies of the 2011 USFWS revised recovery plan for the Mojave population of the desert tortoise (USFWS 2011a) and the 2011 USFWS plan development guidance for translocation of desert tortoises (USFWS 2010b). The USFWS translocation guidance further requires that:

- Disease prevalence within the resident desert tortoise population is less than 20%.
- Recipient areas should be within 25 miles (40 kilometers [km]) of the impact area, with no natural barriers to movement between them, to ensure that the desert tortoises at the two sites were likely part of a larger mixing population and similar genetically.
- Release sites must be at least 6.25 miles (10 km) from major unfenced roads or highways.
- Recipient areas include a dispersal radius of 4 miles (6.5 km) from release points.

2.1.1.2 Areas Considered but Eliminated as Potential Recipient/Control Areas

All areas in the vicinity of the Combat Center were considered for use as potential recipient and control areas. Application of the criteria above narrowed the range of feasible areas. Habitat quality, or comparability between recipient and control areas/sites, was the primary criterion used in selecting recipient and control areas/sites. Other criteria were applied as risk factors to further eliminate areas where the combination of factors resulted in unacceptable levels of risk. Table 2.1-1 lists the areas considered and the results of a screening evaluation based on the criteria presented above in Section 2.1.1.1.

Table 2.1-1. Areas Eliminated from Further Consideration as Recipient or Control Areas

Area	Reason(s) for Elimination from Further Consideration
South of WEA	<ul style="list-style-type: none"> • Generally too close to major risk factors, including CA-247 and human habitation. • Narrow corridor of low quality habitat. Habitat quality deteriorates further in the south, towards the mountains.
Southwest of WEA	<ul style="list-style-type: none"> • Poor quality habitat. • Human habitation (Lucerne).
West of WEA	<ul style="list-style-type: none"> • Habitat quality is limited. • Johnson Valley OHV Area (high risk factor).
Far West of WEA	<ul style="list-style-type: none"> • High risk factors, including CA-247, City of Barstow, the Stoddard Valley OHV Area (located west of CA-247), Interstate-15, and human habitation further west. • Low quality habitat.
Between Ord Mountains and Newberry Mountains	<ul style="list-style-type: none"> • Poor quality habitat (high elevation). • Proximity to Barstow.
Interstate-40 Corridor (West of Cady Mountains and Northward)	<ul style="list-style-type: none"> • Interstate-40 (extremely high risk factor). • Northern side of Interstate-40 contains human developments on the west side, and poor quality habitat towards the east (the sand-blown mountains west of Cady Mountains Wilderness Study Area). • Poor quality habitat southwest of Cady Mountains Wilderness Study Area (low elevation, stunted vegetation), and lava flow on southern side of Interstate-40.

**Table 2.1-1. Areas Eliminated from Further Consideration as Recipient or Control Areas
(continued)**

Area	Reason(s) for Elimination from Further Consideration
Interstate-40 Corridor (from West edge of Cady Mountains Eastward)	<ul style="list-style-type: none"> • Interstate-40 (extremely high risk factor). • Limited quality habitat (including mountains) adjacent to Interstate-40 and further north.
Northeast and East of the Combat Center	<ul style="list-style-type: none"> • Low quality habitat due to low elevations near Amboy Road and high, steep mountains near Kelbaker Road. • Bristol Salt Lake and Cadiz Sand Dunes are located east of the Combat Center and provide low-quality habitat (low elevation, poor vegetation, and poor substrate).
Sheephole Valley Wilderness Area	<ul style="list-style-type: none"> • Steep and low quality habitat for tortoises.
Wonder Valley Area	<ul style="list-style-type: none"> • Very low quality habitat (low elevation, very poor substrate, and very poor vegetation, especially toward Danby Dry lake) south of the Cleghorn Lake RTA in the SEA. • Amboy Road (high risk factor). • Human habitation on both sides of Amboy Road (high risk factor).
South of the Combat Center	<ul style="list-style-type: none"> • Narrow corridor with relatively dense human habitation (Twentynine Palms through Yucca Valley).
Other Areas on Combat Center	<ul style="list-style-type: none"> • Maneuver training (high risk factor). • Many areas with poor quality habitat.

Legend: CA-247 = California State Route 247; SEA = Southern Expansion Area; WEA = Western Expansion Area; RTA = Range Training Area.

2.1.1.3 Recipient Areas Selection

Following the criteria identified above, recipient areas were identified in the 2011 GTP for tortoise release. The Marine Corps identified recipient areas for placement of specific release sites that would optimize translocation success. For the WEA, seven areas were identified as recipient areas, including:

- Two Special Use Areas in the WEA;
- Three areas adjacent to the northern border of the WEA (“Ord-Rodman”), one of which abuts a Special Use Area and two of which are in a BLM grazing allotment; and
- Two areas on the Sunshine Peak Training Area (Figure 2.1-1).

Each area is about 5,400 to 9,600 acres in size (2,200 to 3,900 ha) and collectively total approximately 42,300 acres (17,100 ha). In the SEA, the entire 2,935 acre (1,188 ha) proposed Special Use Area was identified as a recipient area (Figure 2.1-1). Two alternate areas were also considered, one in the Emerson Lake Training Area and the other in the Bullion Training Area (Figure 2.1-1). Both locations are in Special Use Areas wherein travel outside the MSRs is discouraged (though not restricted) because of biological and/or cultural sensitivities. These proposed and potential recipient areas are listed in Table 2.1-2.

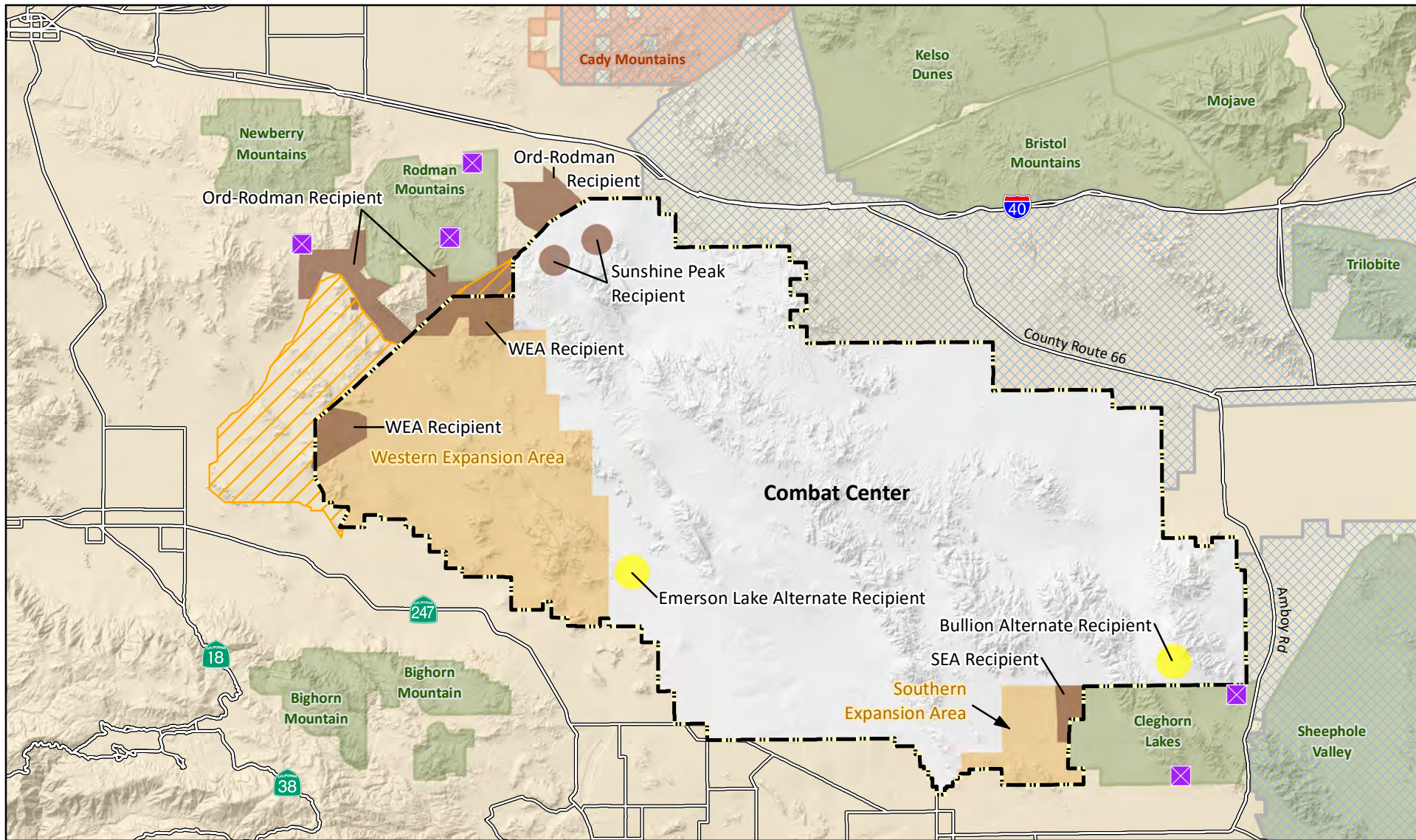


Figure 2.1-1. Proposed and Alternate Recipient Areas and Proposed Control Areas under the No-Action Alternative

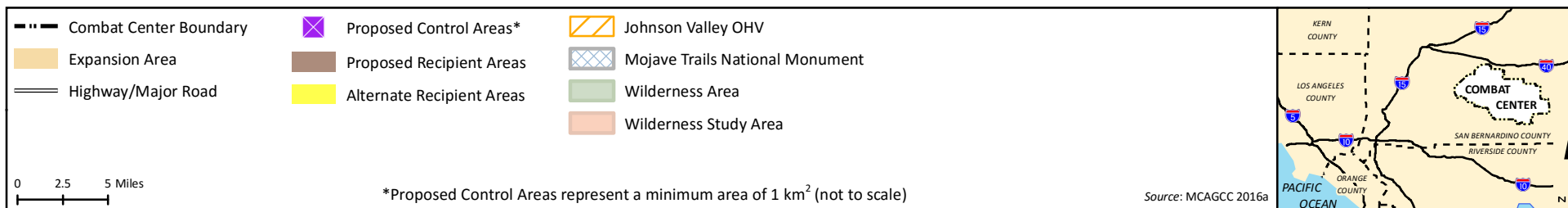


Table 2.1-2. Recipient Areas for the No-Action Alternative

Recipient Areas	Location	Jurisdiction	Size (acres)
Proposed Areas			
WEA Areas	WEA	DON/Marine Corps	12,015
Ord-Rodman Areas	Northwest of Combat Center	BLM	23,475
Sunshine Peak Areas	Sunshine Peak RTA	DON/Marine Corps	3,707
SEA Area	SEA	DON/Marine Corps	2,935
Total			42,269
Potential Alternate Areas			
Emerson Lake	Emerson Lake RTA	DON/Marine Corps	2,471
Bullion	Bullion RTA	DON/Marine Corps	2,471
Total			4,942

Legend: BLM = Bureau of Land Management; DON = Department of the Navy; RTA = Range Training Area; SEA = Southern Expansion Area; WEA = Western Expansion Area.

2.1.1.4 Control Areas Selection

Five control areas were identified in the 2011 GTP (Figure 2.1-1). The purpose of the control areas is to provide comparative desert tortoise data (including data on survival, threats to survival, habitat stability and changes, and health and disease, as described in Section 2.1.3, *Post-Translocation Monitoring*) and enable a comparison between areas and tortoises affected by translocation and areas and tortoises not affected by translocation. Therefore, control area conditions need to be as similar as possible to paired recipient area conditions in terms of habitat, land uses, tortoise density, and health status. Per the USFWS translocation guidance (USFWS 2010b), control areas must not have foreseeable development or other impacts precluding tortoise occupancy and should be approximately 6.25 miles (10 km) from recipient areas. Two control areas were identified in the Rodman Mountains Wilderness Area, one control area was identified on the western edge of the Ord-Rodman region, and two control areas were identified in the Cleghorn Lakes Wilderness Area, to meet these site selection criteria. No other suitable areas were identified based on the selection of recipient sites for this alternative and the screening evaluation that narrowed the range of feasible recipient/control areas (see Section 2.1.1.2).

This would enable the Combat Center to monitor and observe what effects, if any, resulted from translocation of the tortoises. Monitoring survival, disease, habitat and threats in the study cohorts, particularly the control group, is consistent with Strategic Element 4 (monitoring progress towards recovery) of the Revised Recovery Plan for the Mojave Population of the Desert Tortoise (USFWS 2011a). Based on USFWS guidance, it is anticipated that approximately 200 tortoises would be needed for effectiveness monitoring in each of the recipient and control areas.

2.1.1.5 Special Use Area Establishment

The 2011 GTP proposed two Special Use Areas in the WEA, and one Special Use Area in the SEA. The new Special Use Areas in the WEA would be designated as Category 1, except for a portion of the northern Special Use Area, which would be designated as Category 2 from an existing road to the Combat Center boundary. Two alternative areas were identified, one in the Emerson Lake Training Area and the other in the Bullion Training Area, both of which would be designated Category 2.

2.1.2 Translocation Methods

Translocation methods would include handling procedures, fencing, translocation, and clearance surveys as summarized below. Additional information about translocation methods is available in the 2011 GTP (Appendix A).

2.1.2.1 Handling Procedures

All tortoise handling would be accomplished by techniques outlined in the *Desert Tortoise Field Manual* (USFWS 2009), including the most recent disease prevention techniques (e.g., USFWS 2016b). Handling would adhere to USFWS (2010a) handling guidelines for temperature. Releases during translocation would occur in accordance with USFWS translocation guidance (USFWS 2010b). Only Authorized Biologists that have demonstrated to the USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately would be allowed to handle tortoises. Tortoises that only need to be moved a few hundred feet (e.g., during fencing) would be hand-carried to the release site. Tortoises that must be moved farther from the capture site would be sequestered in single-use cardboard boxes or sanitized plastic tubs with taped lids. During transport by vehicle, the tortoise tub would be kept shaded and placed on a well-padded surface. Only routes designated “open” by BLM would be used to transport tortoises. Additional details on required handling techniques are provided in the 2011 GTP (Appendix A).

Depending on environmental conditions and hydration states, tortoises would be hydrated using techniques identified by USFWS (2010b). Tortoises that void their bladders between capture and release would be re-hydrated using these techniques and thoroughly rinsed to remove odors potentially attractive to predators.

Data about the size, gender, and health of translocated tortoises would be recorded for each tortoise captured. The tortoises located during clearance surveys would all be marked with project-specific identifying numbers and transmitters would be attached. Juvenile tortoises that are too small to wear transmitters would be moved to established juvenile pens at Tortoise Research and Captive Rearing Sites (TRACRS) where they may become part of the headstart program (the Combat Center’s tortoise rearing program) or be held until translocation occurs or to Special Use Areas. The tortoises transmitters during clearance surveys would then be relocated for translocation. A subset of 20% of the translocated tortoises would retain the transmitters and continue to be tracked following release for monitoring purposes (see Section 2.1.3 for more detail); the transmitters would be removed from the other 80% of the tortoises upon release.

2.1.2.2 Fencing

Tortoise exclusion fencing would be installed for those borders of the new Special Use Areas near maneuver or high use areas. In the WEA, this would be the southern border of the northern Special Use Area and the entire border of the western Special Use Area. In the SEA, the Special Use Area would be fenced on the north, west, and south sides. Further fencing of the Special Use Areas or impact areas is currently not being considered. Under the No-Action Alternative, temporary fences would also be installed around six constrained dispersal sites. Although the precise locations of these sites have not been determined, they would all be located on the Combat Center. No fencing would be erected for proposed recipient areas north of the WEA or in Sunshine Peak.

Fence construction may be completed during any time of the year. Materials and design are described in the 2011 GTP (Appendix A) and in the *Desert Tortoise Field Manual* (USFWS 2009). All permanent exclusion fencing would be inspected monthly and immediately after all rainfall events where soil and water flows through washes or overland and could damage the fence or erode the soil underneath. Temporary fencing would be inspected at least weekly if activities are occurring in the vicinity that could damage the fence. Any damage to installed tortoise fencing, either permanent or temporary, would be repaired immediately. All tortoises found during fence installation would become part of the

translocation study, either as translocatees (if moved from fenced portions of the maneuver routes) or residents (those already living at the recipient areas).

2.1.2.3 Translocation

Consistent with the 2011 GTP (Appendix A), clearance surveys for tortoises and nests were conducted from September 2014 through October 2015 inside the designated medium- and high-intensity MEB operating areas in the WEA and SEA. All tortoises of adequate size were transmittered; juvenile tortoises too small to wear transmitters were moved to new holding pens at MCAGCC Natural Resources and Environmental Affairs (NREA) TRACRS and these juvenile tortoises would be part of the headstart program.

Tortoises would be moved under the handling constraints identified in Section 2.1.2.1. All tortoises would be released under shrubs. Release would occur at least 1 week before daily, midday temperatures are expected to exceed 90 degrees Fahrenheit (°F) (32 degrees Celsius [°C]) air temperature (measured at 2 inches [5 centimeters (cm)] above ground) or 109°F (43°C) ground surface temperature, whichever is lower. The rationale is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area, before the onset of lethal daily temperatures. However, schedules may change and any alteration to the methods in this translocation plan would be submitted to and approved by the USFWS before translocation.

Juvenile tortoises under 4.4 inches (11.2 cm) are highly subject to depredation by dogs/coyotes, badgers, and ravens. Tortoises below this size would be translocated to predator-proof enclosures until they are large enough to be released. Pens would be regularly monitored until all juvenile tortoises are released. Any viable nests found in the clearance area would be moved as described in the 2011 GTP. Desert tortoises that exhibit moderate to severe nasal discharge would not be translocated, and may be sent to a USFWS-approved facility where they would undergo further assessment, treatment, and/or study. Additional details on translocation are provided in the 2011 GTP (Appendix A).

2.1.2.4 Subsequent Clearance Surveys and Translocation

For up to the first 5 years following initial translocation, clearance surveys would be conducted in the high- and moderate-impact areas to remove remaining desert tortoises. Subsequent clearance surveys would occur only in those 1 square kilometer (km²) mapping units in which prior surveys detected three or more adult desert tortoises. For any tortoise found, the standard measurements and assessments that were used on other tortoises would be completed and the tortoise numbered. All tortoises that are suitable candidates for translocation, based on the health assessment, would be translocated to the designated recipient areas, but not in a mark-recapture plot area (see description of this in Section 2.1.3). All clearances would be consistent with methods described above for the initial translocation effort.

2.1.3 Post-Translocation Monitoring

Because of the size of the translocated population, radio-telemetry tracking of all tortoises is impractical. However, substantial information on survival of translocatees, as well as on population demography, repatriation, and health, can be gathered by repeated readings of mark-recapture plots where tortoises have been translocated. Mark-recapture plots would be used to estimate the tortoise population size by capturing, marking, and releasing a portion of the population then later capturing another portion and counting the number of marked individuals. Capture, marking, and releasing activities would not involve any ground disturbance. An estimate of the total population size can then be determined by dividing the number of marked individuals by the proportion of marked individuals in the second sample. Mark-recapture plots at control and recipient areas would be repeatedly evaluated to help monitor the survival

of translocatees and residents. These plot analyses would also provide estimates of tortoise density (tortoises per square mile [tortoises per km²]) and demography (e.g., sex and age structure), and support planned measures of site fidelity (the tendency to return to a previously occupied location), health assessments, and other variables (e.g., habitat condition and health parameters) that may determine or help explain the survivorship of the groups at the translocation and control areas. These plots, especially control plots, would also provide a general reference for population monitoring in the area. A total of 10 to 12, 247 acre (100 ha) mark-recapture plots would be established in the recipient and control areas. Four plots would be in the control areas and eight would be in the recipient areas. Each plot would be re-surveyed for population density and structure every 5 years for 30 years.

Transmitters would be affixed to approximately 20% of the translocated tortoises as well as an equal number of control and resident tortoises. Translocated, resident, and control tortoises would be tracked the first year according to the schedule in USFWS Guidance (2010a). Tortoises would be tracked weekly during April, May, October, and the last half of September; every 2 weeks from June through the first half of September; and monthly from November through February.

After 5 years, the radio-telemetry study group would be decreased to 150 tortoises (50 per cohort) and would be monitored via radio-telemetry for an additional 5 years (10 years total). Transmitters would be removed at the end of 10 years unless USFWS and State wildlife resource agencies have determined further action is warranted (USFWS 2010b).

A monitoring program would be conducted to determine the effectiveness of the translocation. This rigorous monitoring program would also permit the identification of specific factors or thresholds that may require the implementation of adaptive management. The latter would be developed through coordination with USFWS and State wildlife agencies, as appropriate. Four subject areas would be investigated by monitoring, each of which is described below:

- **Survival:** Survival of translocatees is the main metric for evaluating translocation as a take minimization measure. Survival of translocated tortoises would be measured using two methods: mark-recapture plots and tracking.
- **Threats to survival:** Anthropogenic disturbances and predator populations that cause potential risks to recovery and translocation success threats would be assessed both qualitatively and quantitatively and compared to current levels.
- **Habitat stability/changes:** Habitat would be assessed to monitor changes or stability during each reading of the mark-recapture plots.
- **Health and disease:** The incidence of disease and other health issues would be monitored using body condition indices, clinical signs of disease, serology, and visual inspection for injuries. This would be accomplished using both telemetered tortoises and all tortoises captured on mark-recapture plots. Any health problems observed (e.g., rapid declines in body condition, perceived outbreaks of disease, mortality events) would be reported to the USFWS, CDFW, and BLM such that appropriate actions can be taken in a timely manner.

Predator monitoring and control was not proposed as part of the 2011 GTP.

2.1.4 Other Research

The Marine Corps, in consultation with USFWS, identified a research program to benefit recovery of the species. Research topics include translocation effectiveness, constrained dispersal (“repatriation” in the 2011 GTP), stocking densities, habitat, and disease. Two main research topics that would be

implemented are summarized below, both of which are anticipated to provide results that are topical and important for recovery. Additional information about this research is available in the 2011 GTP (Appendix A).

2.1.4.1 Experimental Translocation Densities

The intent behind this research is to evaluate the capability of the habitat to sustain a certain density of tortoises. Under the No-Action Alternative, a broad range of densities was selected to determine at what level ecosystem support functions were optimized and/or exceeded.

The 2011 GTP proposed average post-translocation densities would be greater than the current Ord-Rodman density (19.5 tortoises per square mile [7.5 per km²]), as estimated by ongoing USFWS line-distance sampling. This approach is supported by the much higher tortoise densities seen in the last 15 to 30 years (MCAGCC 2011) and tests the hypothesis that the declines may have little or nothing to do with the carrying capacity of the existing habitat. Rather, the habitat may be capable of supporting higher densities than are currently present in the recipient area. Also, this experimental approach would assist USFWS in guiding future post-translocation densities. To address these questions, post-translocation densities would vary from 1.3 times (25.35 tortoises per square mile [9.75 per km²]) the Ord-Rodman density to 3.0 times (58.5 tortoises per square mile [22.5 per km²]) the Ord-Rodman density. In addition, four of the mark-recapture plots would be placed in control areas. Survival, population density, population structure, condition indices, and health status would be measured on these 12 plots every 5 years for 30 years. Habitat variables, disturbance, and threats would also be measured at the same time.

2.1.4.2 Constrained Dispersal

Constrained dispersal (called “repatriation” in the 2011 GTP) is a technique wherein tortoises are translocated to a fenced site to encourage settling before the fence is removed. Unlike simple translocation to unfenced sites where tortoises may immediately travel away from the site, tortoises released via constrained dispersal would remain because they would establish home ranges and become part of the social hierarchy within the fenced area before the fence removal. The 2011 GTP proposed four to six constrained dispersal pens on the Combat Center, each 640 acres (260 ha) in size. Precise locations for these sites have not been determined, but all sites would be located on the Combat Center within 2.5 miles (4 km) of an MSR. Tortoise exclusion fencing would be placed around the perimeter of each site. A road would be constructed around each site to provide access from the nearest MSR. For the six proposed sites, road and fence construction would impact up to 93.1 acres (37.7 ha) of desert scrub, the most common vegetation type on the Combat Center. The tortoise exclusion fencing would be removed 2 years after initial translocation to assess fidelity for the new site and allow tortoises to become members of the greater population. Post-translocation densities in these constrained dispersal areas were identified as 68 tortoises per square mile (26 per km²) in the WEA, and 42 tortoises per square mile (16 per km²) in the SEA.

2.2 ALTERNATIVE 1

Implementation of Alternative 1 would entail the translocation of desert tortoise as described in the March 2016 desert tortoise translocation plan (Appendix A; MCAGCC 2016b). A summary of the March 2016 Translocation Plan and how it compares to the 2011 GTP (the No-Action Alternative) is provided below.

2.2.1 Recipient and Control Sites

2.2.1.1 Recipient and Control Site Selection Criteria

Recipient site selection criteria for Alternative 1 were modified as compared to those identified in the 2011 GTP (see Section 2.1.1.1). Recipient sites under Alternative 1 must meet the following modified criteria (MCAGCC 2016b) to ensure that translocation would successfully support tortoise recovery:

- **Sites should be part of a connected system of occupied desert tortoise habitat.** The site exists within a continuous landscape of occupied habitat. No significant barriers to movement separate the site from surrounding habitat, allowing genetic flow across the area.
- **Tortoise populations on and/or near the recipient sites are such that translocation augments a site and does not conflict with resource constraints.** Population levels show a downward historic trend. No notable site-specific conditions (e.g., habitat modification) exist that suggest the site would be unable to support additional tortoises, within limits of past population levels.
- **The lands must comprise sufficiently good habitat that they are either currently occupied or could be occupied by the desert tortoise. Habitat on the recipient sites must be suitable for all life stages.** The right mix of factors exists to support juvenile and adult tortoises. These factors include soils that support burrowing, plants that provide shade cover, sufficient fodder, and other supporting factors.
- **Sites that are protected or receive adequate protection.** Land use designations and site locations limit future development and other high-impact activities. Examples include designated ACECs and areas distant from human development.
- **Lands should not be subject to elevated threats (e.g., predation, disease, exotic invasive plant species) or intensive historic, current, or future land uses (e.g., recreational use, development, habitat degradation) that could compromise habitat recovery or render it too lengthy to be useful during the initial translocation years. These considerations also must extend to surrounding lands onto which tortoises might disperse.** Specific threats present at the recipient sites and surrounding areas do not preclude continued survival of desert tortoise populations. For example, predation rates, disease prevalence, and human uses of the land should all be low intensity.

These criteria are consistent with the goals, objectives, and recovery strategies of the Recovery Plan USFWS (2011a) and USFWS translocation guidance (USFWS 2010b), as identified in Section 2.1.1.1 for the No-Action Alternative.

Beyond the basic criteria for recipient sites that would optimize translocation, there are additional considerations pertaining to monitoring and research that are critical components for evaluating the success of the translocation program:

- Replicates (copies of research treatments that can be compared to one another to validate an experiment), both among sites and individuals, are crucial for statistically examining translocation effects.
- Control sites must be similar to recipient sites (e.g., habitat type/quality, post-translocation population density, and disease status), but not influenced by translocation to recipient sites. USFWS (2011b) recommends a separation distance of approximately 6.25 miles (10 km).

- Experimental sites must be sufficiently separated to avoid interference between sites (generally at least 4 miles [6.5 km]).
- The intensive tracking schedule required by USFWS (2011b, 2012) requires that individuals be found virtually weekly throughout the year, largely because translocatees travel erratically and unpredictably and can be lost easily. The tracking requirements for Year 1 are:
 - Within 24 hours of release
 - Twice weekly for the first 2 weeks
 - Weekly from March through early November
 - Twice monthly from November through February

Tracking requirements for years 2-5 are only slightly less intense. Accordingly, access to transmittered individuals must be continuous. Because range access on the Combat Center is highly restricted due to training exercises, transmittered animals cannot be released on the Combat Center without considering alternative tracking schedules and other monitoring efforts. For the Sunshine Peak portion of the Rodman-Sunshine Peak dispersal area, the Combat Center will implement a combination of occasional radio tracking combined with multiple line transects to span most of the Sunshine Peak Training Area.

2.2.1.2 Recipient and Control Site Selection

The Combat Center identified and refined recipient and control sites relative to size and location following a 3-year program of surveys, literature review, and consultation with resource agencies. The surveys looked at areas initially identified in the 2011 GTP (MCAGCC 2011) and several additional areas. Recipient sites were selected by evaluating this information relative to the criteria listed in Sections 2.1.1.1 and 2.2.1.1 to ensure that translocation would successfully support tortoise recovery. The range of feasible locations for recipient and control site selection had also been narrowed as a result of the screening evaluation described in Section 2.1.1.2. Beyond the basic criteria for recipient sites to optimize translocation, the Combat Center used additional considerations pertaining to monitoring and research to evaluate the success of the translocation program and minimize the use of wilderness areas. Each recipient site is paired with a control site(s) to match genetics, habitat, and local weather patterns. Control sites have been selected according to the criteria described in Sections 2.1.1.1 and 2.2.1.1.

Six recipient sites and six control sites were designated and are shown in Figure 2.2-1. Each recipient site is paired with one or more control sites (Table 2.2-1). Recipient sites include both a release area and a dispersal area. A release area is a smaller component of a recipient site where the tortoises would be physically released during translocation, and a dispersal area includes the remainder of the overall recipient site within which the released tortoises are expected to disperse following release. No other suitable control sites were identified based on the selection of recipient sites for this alternative and the screening evaluation that narrowed the range of feasible recipient/control areas (see Section 2.1.1.2).

Conservation areas and land uses within or nearby each recipient and control site are described in Table 2.2-2. Site conditions for recipient and control sites are summarized below, with additional information available in the March 2016 desert tortoise translocation plan (Appendix A).

Table 2.2-1. Recipient Sites and Paired Control Sites for Alternative 1

Recipient Site	Size (acres)	Closest Distance from Impact Area (miles) ¹	Paired Control Site 1	Size (acres)	Distance between Recipient Site and Paired Control Site 1 (miles) ²	Paired Control Site 2 (If Applicable)	Size (acres)	Distance between Recipient Site and Paired Control Site 2 (miles) ²
Lucerne-Ord	37,619	10.4	Rodman-Sunshine Peak South	13,563	11.4	Daggett	6,183	12
Rodman-Sunshine Peak North	26,078	4.9	Rodman-Sunshine Peak South	13,563	3.2	Daggett	6,183	23
Siberia ³	13,399	16.7	Ludlow	3,054	2.9	NA	NA	NA
Broadwell	10,121	19.2	Calico	1,994	3.6	NA	NA	NA
Cleghorn	2,321	0.5	Cleghorn Control	1,964	0.7	NA	NA	NA
Bullion	13,073	6.4	Bullion Control	2,010	1.1	NA	NA	NA

Legend: NA = Not Applicable.

Notes: ¹ This is the distance from the nearest edge of the Release Area within the individual Recipient Sites to the nearest edge of the impact areas.

² This is the distance from the nearest edge of the Release Area within the individual Recipient Sites to the nearest edge of the Control Site.

³ Value represents the 62% of the 21,612 acre site that has a habitat suitability index of 0.6 or greater, derived from Barrows et al. (2016).

Table 2.2-2. Associated Conservation Areas and Land Uses for Recipient and Control Sites under Alternative 1

Site	Jurisdiction	Associated Conservation Areas	Land Uses
Recipient Sites			
Lucerne-Ord*	BLM	<ul style="list-style-type: none"> Substantially overlaps: Ord-Rodman ACEC; Ord-Rodman Critical Habitat Unit; Proposed National Landscape Conservation System (DRECP); Ord-Rodman Tortoise Conservation Area. 	<ul style="list-style-type: none"> Large transmission line corridor. Limited Use OHV designation but possible proliferation anticipated. Overlaps Ord Mountain grazing allotment. Mixture of federal and private lands. Scattered occupied residents >6.6 km south of the release area.
Rodman-Sunshine Peak North*	BLM and DON/Marine Corps	<ul style="list-style-type: none"> Overlaps portions of the Combat Center Sunshine Peak and Lavic Lake RTA Special Use Areas. Substantially overlaps: Ord-Rodman ACEC; Ord-Rodman Critical Habitat Unit; Proposed National Landscape Conservation System (DRECP); Sunshine Peak Training Area; Ord-Rodman Tortoise Conservation Area. Bordered by Rodman Mountains Wilderness Area. 	<ul style="list-style-type: none"> Large transmission line corridor. No projected future use of area. Overlaps Ord Mountain grazing allotment approximately 3 km². All lands federally owned.
Siberia	BLM	<ul style="list-style-type: none"> In: Mojave Trails National Monument and Proposed ACEC (DRECP). Overlaps the Proposed National Landscape Conservation System (DRECP). Borders the Combat Center. 	<ul style="list-style-type: none"> Negligible recreation use, although underground natural gas pipelines provide ingress routes. No projected use of area but large block of private lands in west - former proposed solar energy project. Mixture of federal, state, and private lands.
Broadwell	BLM	<ul style="list-style-type: none"> Substantially overlaps: Cady Mountains Wilderness Study Area; Proposed National Landscape Conservation System (DRECP); Proposed ACEC (DRECP); and Mojave Trails National Monument. Near Kelso Dunes Wilderness Area. 	<ul style="list-style-type: none"> Retired grazing allotment. Negligible recreation use. No projected future use of area Large transmission line corridor. Nearly all lands federally owned.
Cleghorn*	DON/Marine Corps	<ul style="list-style-type: none"> Entirely on the Combat Center-Cleghorn Lake RTA Special Use Area. Adjacent to Cleghorn Lakes Wilderness Area. 	<ul style="list-style-type: none"> Scattered occupied houses with dogs, 6.7 km south.
Bullion	DON/Marine Corps	<ul style="list-style-type: none"> Entirely on the Combat Center-Bullion RTA Special Use Area. 	<ul style="list-style-type: none"> Training would occur in the recipient site outside the Special Use Area.

Table 2.2-2. Associated Conservation Areas and Land Uses for Recipient and Control Sites under Alternative 1 (continued)

Site	Jurisdiction	Associated Conservation Areas	Land Uses
Control Sites			
Rodman-Sunshine Peak South	BLM and DON/Marine Corps	<ul style="list-style-type: none"> On the Combat Center Special Use Area. Substantially overlaps: Ord-Rodman ACEC; Ord-Rodman Critical Habitat Unit; Proposed National Landscape Conservation System (DRECP); Sunshine Peak Training Area; Ord-Rodman Tortoise Conservation Area. Bordered by Rodman Mountains Wilderness Area. 	<ul style="list-style-type: none"> Large transmission line corridor. Residual Open OHV Area to north (would be fenced with tortoise exclusion fencing). Proposed expanded Open OHV Area to west (Cook Bill). Overlaps Ord Mountain grazing allotment. All lands federally owned.
Daggett	BLM	<ul style="list-style-type: none"> In: Ord-Rodman ACEC; Ord-Rodman Critical Habitat Unit; Proposed National Landscape Conservation System (DRECP). Abuts Rodman Mountains Wilderness Area. 	<ul style="list-style-type: none"> Large electrical transmission line corridor. Mixture of federal and private land. No projected future use of area 3. ≥1.3 km south of Interstate-40 and Daggett.
Ludlow	BLM	<ul style="list-style-type: none"> In: Mojave Trails National Monument and Proposed ACEC (DRECP). Overlaps the Proposed National Landscape Conservation System (DRECP). Near the Combat Center. 	<ul style="list-style-type: none"> Negligible recreation use, although underground natural gas pipelines provide ingress routes. Mixture of federal and state lands.
Calico	BLM	<ul style="list-style-type: none"> Substantially overlaps: Proposed National Landscape Conservation System (DRECP) and Proposed ACEC (DRECP). Abuts: Mojave Trails National Monument and Cady Mountains Wilderness Study Area. 	<ul style="list-style-type: none"> Retired grazing allotment. Negligible recreation use. No projected future use of area 2. Large electrical transmission line corridor. Mostly federal land ownership.
Cleghorn Control	DON/Marine Corps	<ul style="list-style-type: none"> Entirely on the Combat Center- Cleghorn Lake RTA Special Use Area. Adjacent to Cleghorn Lakes Wilderness Area. 	<ul style="list-style-type: none"> Scattered occupied houses with dogs, 5.5 km southeast.
Bullion Control	BLM	<ul style="list-style-type: none"> Entirely in Cleghorn Lakes Wilderness Area. Borders the Combat Center. 	<ul style="list-style-type: none"> Training would occur in the recipient site outside the Special Use Area

Legend: ACEC = Area of Critical Environmental Concern; BLM = Bureau of Land Management; DON = Department of the Navy; DRECP = Desert Renewable Energy Conservation Plan (California Energy Commission et al. 2014); km = kilometers; km² = square kilometers; MCAGCC = Marine Corps Air Ground Combat Center; OHV = Off-Highway Vehicle; RTA = Range Training Area.

Note: *These sites are overlapping or located in proximity to recipient areas identified in the 2011 GTP; all other sites are newly identified.

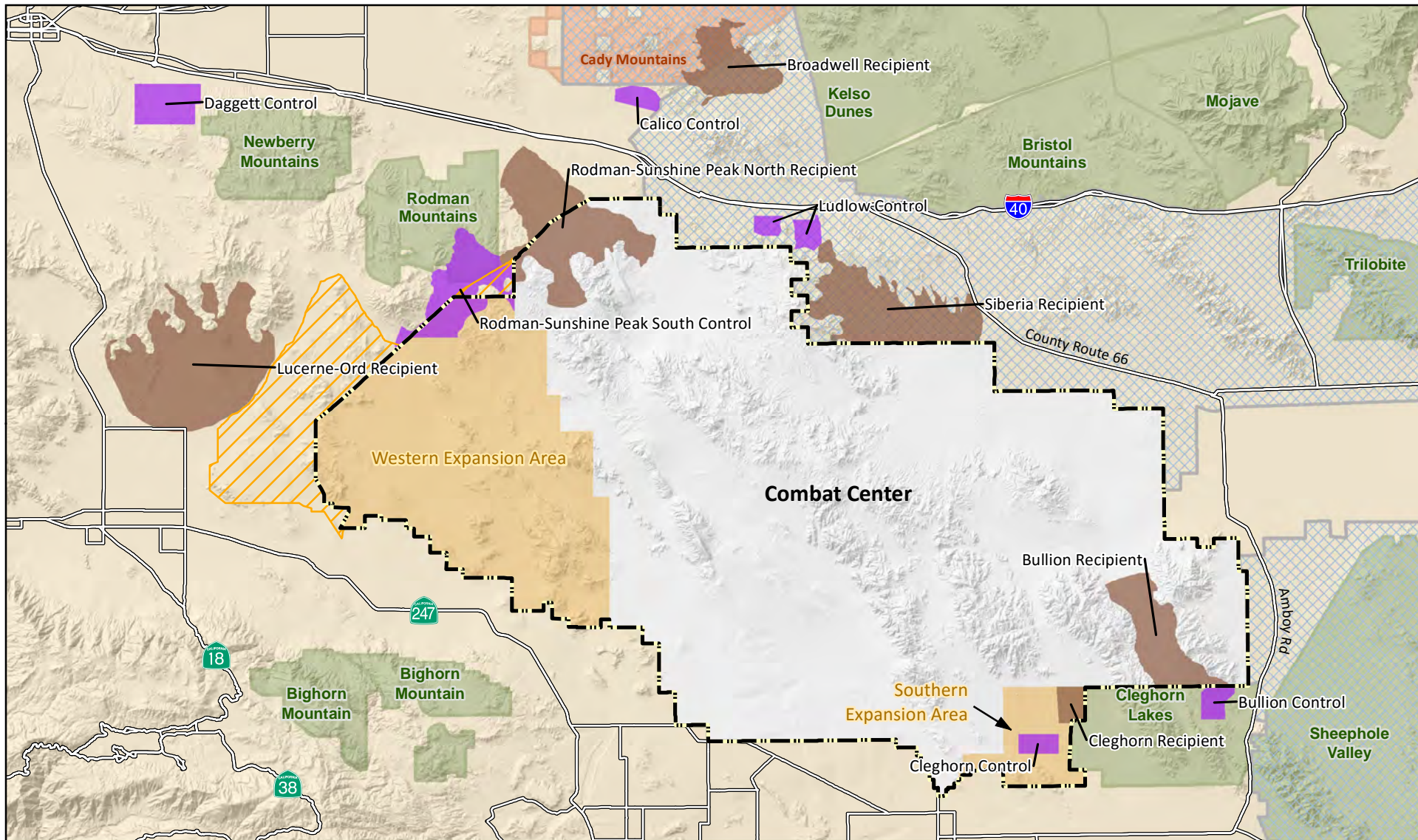


Figure 2.2-1. Recipient and Control Sites under Alternative 1



Recipient Sites

- **Lucerne-Ord:** The Lucerne-Ord recipient site (Figure 2.2-2) was placed in the Ord-Rodman West recipient area identified in the 2011 GTP. This site is a broad area of mixed, fair- to good-quality habitat with a pre-translocation density of 13.5 tortoises per square mile (5.2 per km²) (see Section 3.1, *Biological Resources*, for a description of habitat quality for the desert tortoise). The site lies in a large bowl with natural topographic barriers (Ord Mountains) to the west and north. There are no highways or heavily used roads in or adjacent to the site. While the site receives substantial protection from future development via its overlap with multiple conservation areas, the Land Acquisition EIS suggests the nearby Ord Mountain route network may see increased OHV activity as a result of displaced use from Johnson Valley. However, this displaced OHV activity should be less than originally expected due to the NDAA preserving more land to be available for recreation in the Shared Use Area (see Section 1.3.3).
- **Rodman-Sunshine Peak North:** The Rodman-Sunshine Peak North (Figures 2.2-2 and 2.2-3) recipient site was placed amongst the two Sunshine Peak recipient areas and the eastern Ord-Rodman recipient area identified in the 2011 GTP. Consolidating these areas allows for improved translocation management and monitoring. This site is a broad bajada of mixed fair, medium, and moderately-good habitat with a pre-translocation density of 12.7 tortoises per square mile (4.9 per km²). A broad lava flow provides a barrier to tortoise movement toward Interstate-40. No future development is anticipated, and with the exception of an electricity transmission corridor there is little current disturbance. All of the lands are federally-owned (San Bernardino County 2015). This site is relatively protected by its large overlap with conservation areas and Sunshine Peak Range Training Area (RTA), and adjacency to the Rodman Mountains Wilderness Area. Sunshine Peak receives little disturbance. Ground activity, primarily by the Combat Center's Explosive Ordnance Division (EOD), is limited to a few days per year when EOD detonates or removes unexploded ordnance.
- **Siberia:** The Siberia recipient site (Figure 2.2-3) lies on a narrow, steep alluvial fan out of the Bullion Mountains, and has a pre-translocation density of 6.8 tortoises per square mile (2.6 per km²). There are no identified uses of the site that would negatively impact tortoises. A large block of private lands in the west leaves open the possibility of future development, although this area is no longer in a solar energy development zone (California Energy Commission et al. 2014). The area is currently part of the newly established Mojave Trails National Monument.
- **Broadwell:** The Broadwell recipient site (Figure 2.2-3) lies on a large, steeply sloping bajada bordered by low to tall mountains with a pre-translocation density of 13.3 tortoises per square mile (5.1 per km²). Much of the bajada has only moderate utility to tortoises because of the cobbly and gravelly substrates; the low species richness and plant volume is an indicator of this lower quality habitat. Not surprisingly, tortoises were disproportionately found in the incised washes of the upper bajada near the mountain slopes; these also had a high component of caliche cavities favored as burrows by tortoises. The site achieves moderately high protection from overlapping and nearby existing and proposed conservation lands, and nearly all of the lands are federally-owned. There is little current use of the area with the exception of electricity transmission, and future development is not anticipated. This is a new recipient site not identified in the 2011 GTP. The area is currently part of the newly established Mojave Trails National Monument.

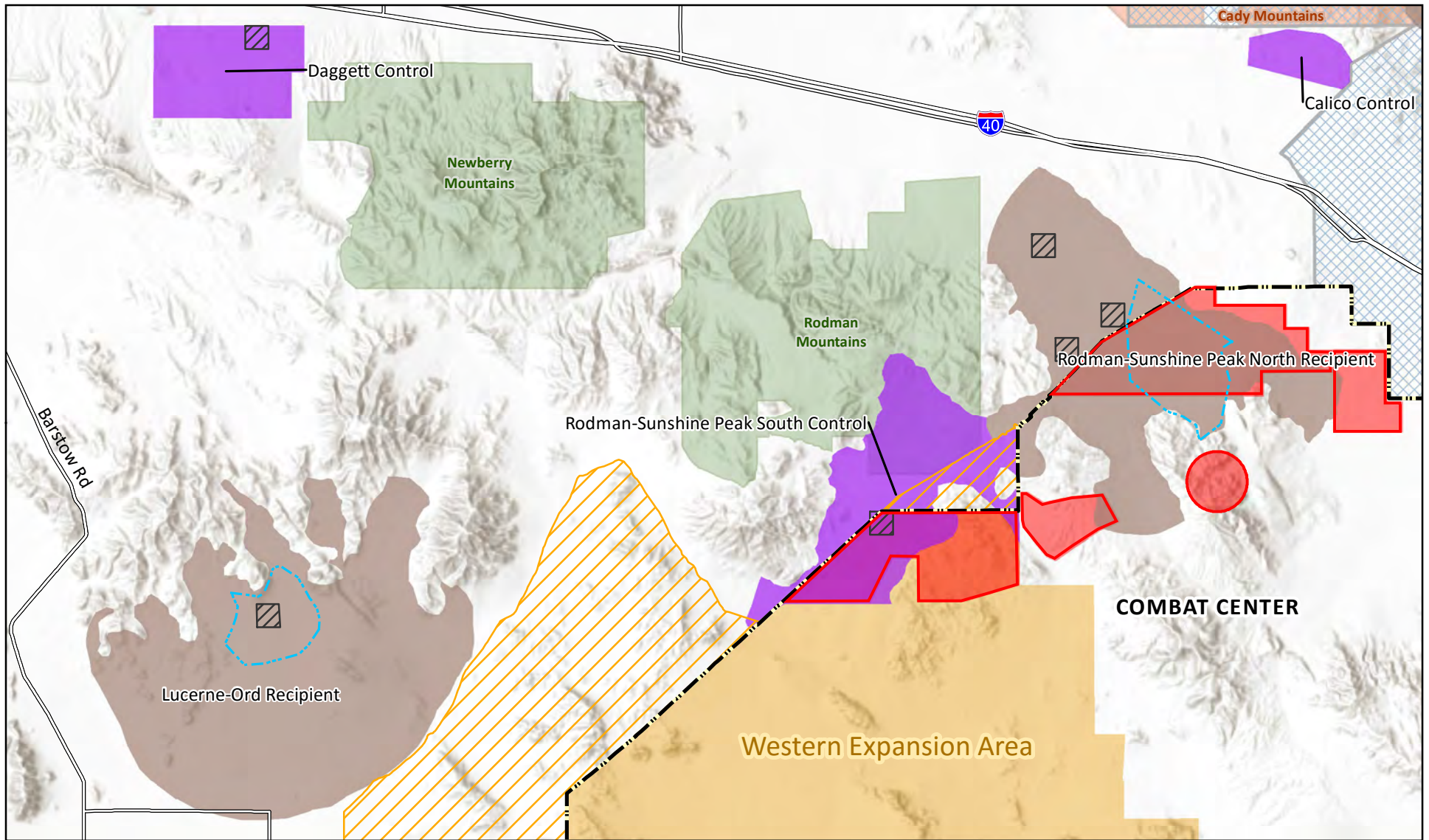
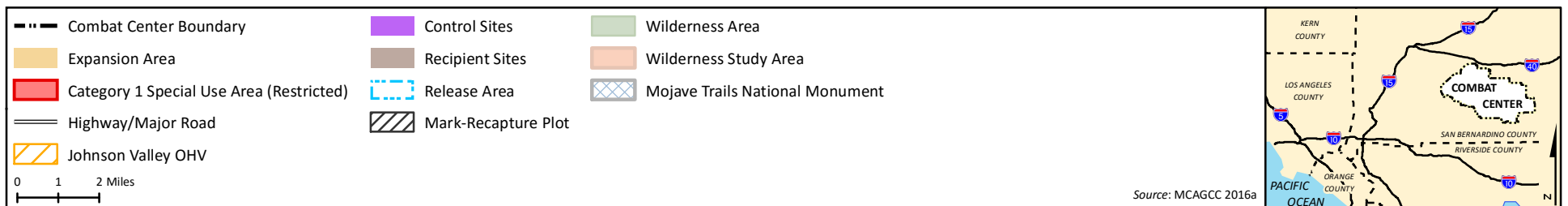


Figure 2.2-2 Detailed View of Recipient and Control Sites West and Northwest of the Western Expansion Area under Alternative 1



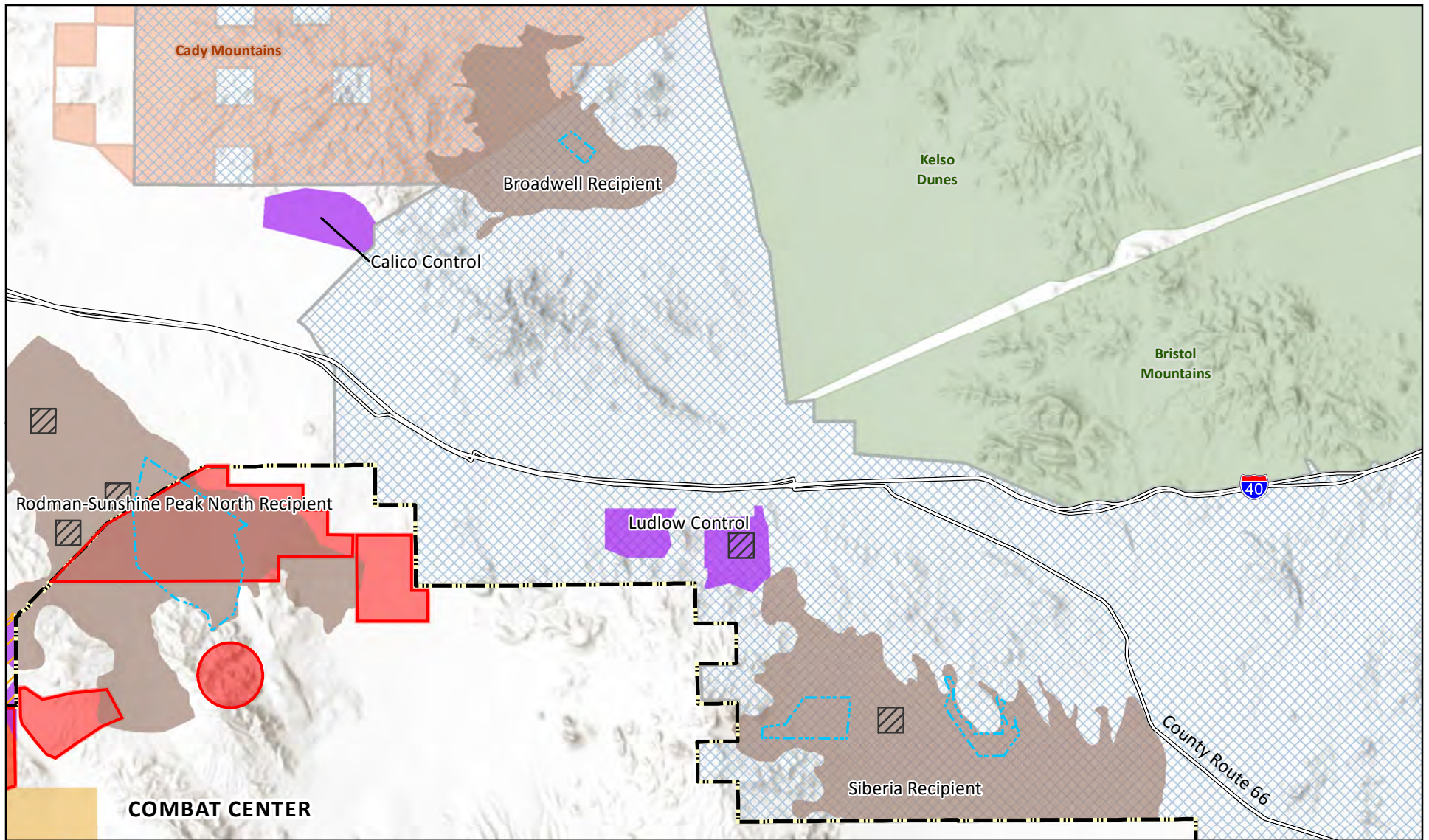
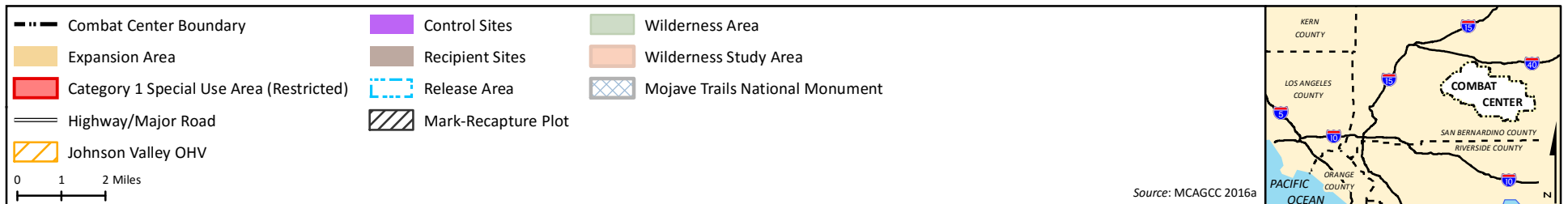


Figure 2.2-3 Detailed View of Recipient and Control Sites North of the Combat Center under Alternative 1



- **Cleghorn:** The Cleghorn recipient site (Figure 2.2-4) was placed in the SEA recipient area identified in the 2011 GTP. This constrained release site would be completely fenced with tortoise exclusion fence and studied as a constrained dispersal site. After 2 years, the constraining fence on the east and south would be removed; the fence excluding tortoises from the Combat Center impact area (northern, western, and southern boundaries of the Special Use Area) would remain in perpetuity. This site is in undeveloped native habitat, with a pre-translocation density of 16.9 tortoises per square mile (6.5 per km²). The recipient site is in a Special Use Area on the Combat Center, and adjacent to Cleghorn Lakes Wilderness Area, so is protected from public use or development. The dispersal site was placed more than 4.0 miles (6.5 km) from the houses to limit potential trauma from roaming dogs. Further, the Combat Center would (1) implement an information outreach program to encourage people to confine their dogs, (2) conduct a study to monitor dog and coyote presence, (3) install dog and coyote deterrents for the constrained dispersal pen (e.g., hot wire), and (4) implement a dog/coyote control program in the area.
- **Bullion:** The Bullion recipient site (Figure 2.2-4) is located on the Combat Center in the Special Use Area immediately north of Cleghorn Lakes Wilderness Area. The Bullion recipient site hosts high densities of desert tortoise and is not a depleted population. The major site constraint is the limited access for monitoring; access is through the Bullion RTA and the site is remote, requiring substantial time to get there, and access may be limited by the schedule of training activities. This site has good habitat quality and future threats appear to be limited to training activities in that portion of the Combat Center, though such impacts are generally quite low in this area.

Control Sites

- **Rodman-Sunshine Peak South:** The Rodman-Sunshine Peak South control site (see Figure 2.2-2) is paired with the Lucerne-Ord and Rodman-Sunshine Peak North recipient sites. This control site comprises a substantial area of moderately-good and good habitat that is relatively protected by its large overlap with conservation areas, overlap with a Special Use Area identified on the Combat Center, and proximity to the Rodman Mountains Wilderness Area. Future OHV impacts are unlikely but possible. A small triangle (2,965 acres [1,200 ha]) of Johnson Valley Open OHV remains north of the Special Use Area. At this time the only access to this triangle is the electrical transmission line maintenance road, so it is uncertain whether this area would be visited by riders. This could change, however, if the *California Minerals, Off-Road Recreation, and Conservation Act* or Cook Bill (Cook 2015) is passed, it could create a broader connection between this isolated triangle and the main Open OHV area.
- **Daggett:** The Daggett control site (see Figure 2.2-2) was chosen because of its high quality habitat over a relatively broad area and its proximity to its paired recipient site Lucerne-Ord. The Combat Center has also proposed pairing Daggett with the Rodman-Sunshine Peak North recipient site to increase the strength of the analyses, however distance from that recipient site may make Daggett an unsuitable pairing. Its location within conservation lands provides impediment to further development and BLM is not aware of any proposals for its development (Otahal 2015).
- **Ludlow:** The Ludlow control site (see Figure 2.2-3) is paired with the Siberia recipient site and comprises fair to moderately good habitat and is very similar to occupied areas of the paired Siberia recipient site. It is relatively undisturbed by human activities; only an underground natural gas pipeline currently provides access, and use by the public appears negligible. The area is currently part of the newly established Mojave Trails National Monument.

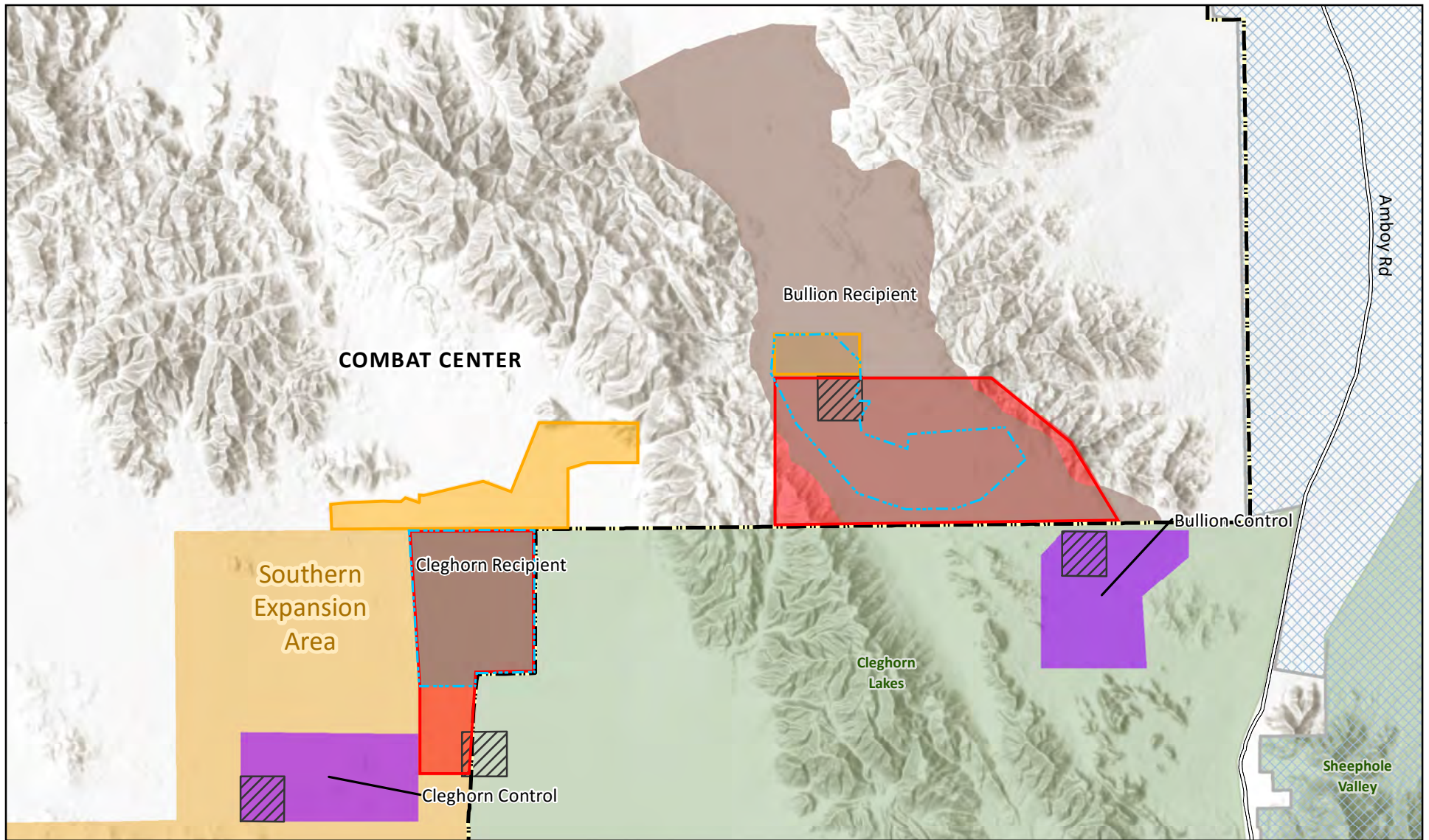
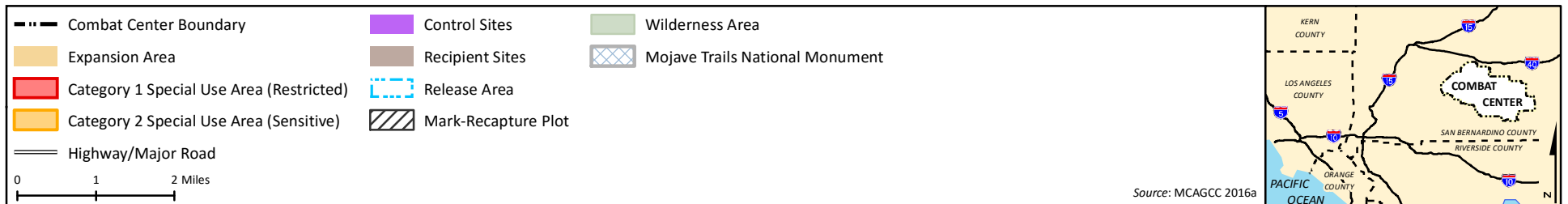


Figure 2.2-4 Detailed View of Recipient and Control Sites within and East of the Southern Expansion Area under Alternative 1



- **Calico:** The Calico control site (see Figure 2.2-3) is paired with the Broadwell recipient site and is situated on a small south-facing bajada against the foothills of the Cady Mountains. It is relatively undisturbed by human activities and the former grazing allotment has been retired. The site is somewhat protected from development, based on current and proposed conservation designations. Calico was considered as a control site for the Rodman-Sunshine Peak North recipient site, however it is too small, does not have comparable habitat type, and is more distant than preferred.
- **Cleghorn:** The Cleghorn control site (see Figure 2.2-3) is paired with the Cleghorn recipient site and is in undeveloped native habitat. The site is in the Combat Center and adjacent to Cleghorn Lakes Wilderness Area, so is protected from public use or development.
- **Bullion:** The Bullion control site (see Figure 2.2-4) is paired with the Bullion recipient site and is located in the northwest portion of Cleghorn Lakes Wilderness Area. This site has good habitat quality, is far from any human impacts, and receives high protection from public activities or development. The major site constraint is the limited access for monitoring; access is through the Bullion RTA and the site is remote, requiring substantial time to get there, and access may be limited by the schedule of training activities.

2.2.1.3 Special Use Area Establishment

Compared to the No-Action Alternative, Alternative 1 moves the westernmost Special Use Area in the WEA into the Bullion RTA.

2.2.2 Translocation Methods

Translocation methods are summarized below and additional information about translocation methods is available in the Alternative 1 Translocation Plan (Appendix A).

2.2.2.1 Handling Procedures

The Combat Center would employ similar handling procedures as those described for the No-Action Alternative. In addition to those procedures, tortoises may be transported via commercial helicopter to reduce transportation time and stress.

2.2.2.2 Fencing

Tortoise exclusion fencing remains a protective measure that would be employed, as described for the No-Action Alternative. In addition, three-strand fencing would be used, primarily to prevent humans and OHVs from entering recipient/control sites and Special Use Areas. The Combat Center would survey the desert tortoise fence alignments for cultural resources and make adjustments to the alignments during installation to avoid cultural resources; adjustments to the alignment may also be made to the alignment due to other field conditions (No-Action Alternative). New recipient sites identified for Alternative 1 may require fencing in some areas.

Fencing and signs include the following:

- Permanent tortoise exclusion fencing with three-strand smooth wire fencing would be installed before translocation. The tortoise exclusion fencing would be 18 inches (45 cm) above ground and the total maximum height with three-strand wire would be approximately 4 feet (ft) (1.3 meters [m]). This would require the excavation of trenches measuring 4 to 6 inches (10 to 15 cm) wide and 12 inches (30 cm) deep and would include three-strand smooth fencing (Photo 1). The trenches would be excavated with a blade on heavy equipment. This fencing would be located in the following areas:



Photo 1: Example of Tortoise Exclusion Fencing

- Between impact areas and recipient sites and/or Special Use Areas (8 miles [13 km] for the Special Use Area in the WEA and 8.9 miles [14.3 km] for the Cleghorn Recipient), to keep tortoises from entering the impact areas;
- Between recipient sites and the Open OHV Area north of the WEA (3.6 miles [5.8 km]); and
- Along the Combat Center border at the Siberia recipient site (7 miles [11 km]), to keep tortoises from crossing into the Combat Center.
- Construction of the three-strand smooth wire fencing (7.3 miles [11.7 km]) would use 1.5-inch by 1.5-inch by 6-ft (4-cm by 4-cm by 2-m) t-posts and then 16 gauge wire would be strung between the posts. The total maximum height of this three-strand wire fence would be approximately 4 ft (1.3 m). This would be located between the Johnson Valley OHV areas and the Special Use Area in the WEA.
- Temporary tortoise exclusion fencing would be installed at two locations to keep tortoises from dispersing into the Cleghorn Lakes Wilderness Area for the first two years of implementation. The temporary tortoise exclusion fencing would be similar to the three-strand smooth wire fencing and located in the following areas:
 - The constrained dispersal plot in Cleghorn Lake RTA (3.7 miles [6 km]); and
 - The southern portion of the Bullion RTA (3.8 miles [6.2 km]).
- There would also be signs (2.6 miles [4.1 km]) mounted on posts along an existing road in the Special Use Area in the WEA.

Access to these areas would be along existing roads, and then a new permanent 16 ft (5 m) wide maintenance road would be left along the fenceline within the Combat Center (not on BLM land), where terrain permits. The active working areas and temporary equipment laydown areas for fence construction would be located on the new maintenance road within 16 ft (5 m) of the fencing or signs (Photo 2).



Photo 2: Example Maintenance Road Adjacent to Tortoise Exclusion Fencing

2.2.2.3 Translocation

Clearance surveys for tortoises were conducted inside the medium- and high-intensity MEB operating areas in the WEA and SEA from September 2014 through October 2015. These clearance surveys found 1,410 tortoises in the WEA and SEA, of which 1,125 adult and juvenile tortoises were transmittered and an additional 285 smaller tortoises were transferred to TRACRS holding pens. Additional surveys on private lands to be acquired within the WEA should yield approximately 18 additional tortoises. The Combat Center anticipates translocating adult tortoises in early spring (mid-March to mid-April) to meet temperature guidelines.

The Combat Center would employ translocation methods similar to those described in Section 2.1.2.3 for the No-Action Alternative. Authorized handlers would find and collect the tortoises. All tortoises would be transported in individual, sanitized plastic tubs with a lid and brought to local processing centers, where they would receive a visual health assessment.

As described in the No-Action Alternative, tortoises that exhibit moderate to severe nasal discharge would not be translocated. Additionally under Alternative 1, the enzyme-linked immunosorbent assay (ELISA) tests would be run on desert tortoises as part of routine health assessment. This test detects specific antibodies in blood, and an ELISA-positive result denotes past exposure to *Mycoplasma spp.* The ELISA test only reveals past exposure, and does not provide evidence of a current infectious outbreak.

During coordination with the CDFW regarding the Alternative 1 translocation plan, the agency requested that the Combat Center consider limiting translocation of ELISA-positive tortoises. As a precautionary measure, the Combat Center agreed not to translocate any ELISA-positive tortoises into desert tortoise critical habitat, and would instead place them in other identified recipient sites.

Each tortoise would be boxed and walked or driven to one of several dispatch points, where groups of tortoises would be flown by helicopter (preferably) or driven to a location at or near the relevant translocation area, according to the approved disposition plan for that tortoise. Biologists would then carry the tortoises from this location to release them at designated release sites. During all transportation, tortoises would be kept shaded, away from hot surfaces, and padded as needed to avoid shell or internal

trauma. Transport of desert tortoises by helicopter would occur over a 10 to 12 day period with an anticipated 40 to 50 total helicopter trips (4 trips per day carrying 25 desert tortoises each trip for a total of 100 desert tortoises per day over a 10- to 12-day period). Helicopters would land within MSRs or other existing roads/routes and preferably within intersections of roads. Tortoises would then be carried on foot to or from the helicopter following capture and for release, respectively. Monitors would be located on the roads at safe distances on either side of the helicopter landing area, to prevent OHVs or unauthorized Combat Center personnel from approaching the helicopter landing area during translocation operations.

Tortoises would be released in a spatial distribution similar to capture distribution to better maintain social groupings. All juveniles of sufficient size for release greater than 4.4 inches (>11.2 cm) would be released near inactive rodent burrows or other protective cavities. As with the No-Action Alternative, juvenile tortoises under 4.4 inches (11.2 cm) would be translocated to predator-proof enclosures until grown enough to release.

2.2.2.4 Subsequent Clearance Surveys

Fencing is not proposed for the high and medium impact areas to exclude tortoises from entering the impact areas. Consequently, subsequent clearance surveys would be conducted and are consistent with those described in the No-Action Alternative.

2.2.3 Post-Translocation Monitoring

Similar to what is described under the No-Action Alternative, monitoring would be conducted to quantify how well the translocation addresses the overarching goal of the translocation to minimize losses and maximize assimilation into the existing population. Post-translocation monitoring is generally consistent with that described in the No-Action Alternative, with the following exceptions:

- Twelve 247 acre (100 ha) mark-recapture plots would be established in the recipient and control sites, with five in control sites and seven in recipient sites. Each plot would be surveyed for population density and structure every 5 years for 30 years, an interval consistent with Strategy 4 of the revised Recovery Plan (USFWS 2011a).
- The Combat Center would implement a combination of radio-telemetry, mark-recapture plots, and transect surveys of tortoise density (USFWS 2010a) to monitor survivorship, tortoise density, health, and habitat quality at the Rodman-Sunshine Peak North recipient site. This includes a series of line transects across the broad dispersal area for the first 3 years. After the first 3 years, these data would be used to determine if there are suitable plot locations for long-term (e.g., 5-year intervals) monitoring, or if monitoring should be continued via the line transects.
- Ready access to the Rodman-Sunshine Peak North site is anticipated at least twice a year and the Combat Center would attempt to schedule additional access to the training area to support tracking telemetered tortoises. If additional access proves infeasible, transmitters for these animals would be removed so tortoises are not burdened with unused transmitters.
- The Combat Center would continue implementing policies that reduce conditions that promote the presence of tortoise predators onboard the Installation, such as water and food-waste controls.
- In addition, the Combat Center is partnering with USFWS to study the effectiveness of raven aversion techniques.

- Post-translocation monitoring and health assessment of translocated and control tortoise populations would be the primary means of detecting predation. This monitoring would be supplemented by regular Conservation Law Enforcement Officer patrols through the recipient and control sites. The Combat Center has also budgeted for predator-specific surveys (e.g., surveys for raven nests along pole lines), and would implement these surveys as funds are available.
- The Combat Center would establish a coyote hunting program aboard the installation, and would deploy personnel for coyote trapping and hunting into areas where coyote predation rates of translocated tortoises exceed those of control populations. Ravens with evidence of predation on tortoises would be reported to USFWS for depredation.

2.2.4 Other Research

Additional research would be conducted under Alternative 1 beyond that described under the No-Action Alternative. The translocation provides numerous opportunities to answer research questions that increase the understanding of the species and advance species recovery. Additional information about monitoring and research is available in the Alternative 1 desert tortoise translocation plan (MCAGCC 2016b; see Appendix A).

2.2.4.1 Experimental Translocation Densities

As described under the No-Action Alternative, translocation densities would vary across different recipient sites to assist USFWS in guiding future post-translocation densities. Post-translocation densities would range from 12.2 tortoises per square mile (4.7 per km²) (Siberia) to 34.3 tortoises per square mile (13.2 tortoises/km²) (Bullion) and represent increases of between 22% and 85% over current densities, and increases of between 24% and 131% over near-term projected densities. As indicated in Table 2.2-3, these post-translocation densities are similar to those proposed under the No-Action Alternative.

Table 2.2-3. Recipient Sites Post-Translocation Densities for Alternative 1

Alternative 1 Recipient Site	Jurisdiction	Initial Density (tortoises per km ²)	Projected Density (tortoises per km ²)*	Planned Number of Translocatees	Post-Translocation Density (tortoises per km ²)
Lucerne-Ord	BLM	5.2	4.0	450	8.2
Rodman-Sunshine Peak North	BLM and DON/Marine Corps	4.9	3.8	186	6.7
Siberia	BLM	4.2	3.8	115	4.7
Broadwell	BLM	5.1	4.1	47	6.2
Cleghorn	DON/Marine Corps	6.5	5.2	52	12.0
Bullion	DON/Marine Corps	10.4	8.4	148	13.2

Legend: BLM = Bureau of Land Management; DON = Department of the Navy; km² = square kilometers.

Notes: *Based on draft USFWS translocation guidance (USFWS 2016a); assumes an 8.3% decrease per year for the Lucerne-Ord and Rodman-Sunshine Peak recipient sites and a 7.1% decrease per year for remaining sites over 3 years.

2.2.4.2 Grazing

Alternative 1 proposes to study cattle grazing compatibility with desert tortoises. The Ord Mountain Cattle Allotment overlaps the Lucerne-Ord Recipient Site, thus providing an opportunity to examine the

effects of grazing on desert tortoises. Data on tortoise populations and grazing practices would be collected, thereby permitting an analysis of both long-term and short-term effects.

While there is information that shows both long-term and short-term changes to habitat as a result of grazing, the detrimental effects are uncertain and some benefits may accrue (Ellison 1960). Specific to desert tortoises, little definitive and focused research has been completed on the effects of cattle grazing (Oldemeyer 1994; Avery 1998; Lovich and Bainbridge 1999). Studies to illuminate the specific grazing factors that affect desert tortoises would assist USFWS and CDFW in recovery efforts. These studies also may assist the allotment operator in revising grazing management practices to accommodate both cattle and tortoises. Such studies are encouraged by the revised desert tortoise recovery plan (USFWS 2011a).

The same basic survivorship, assimilation, tracking, plot density assessments, health assessments, dispersal area evaluations, habitat characteristics, and secondary or explanatory measurements would be measured in the Lucerne-Ord Recipient Site. Data analyses and statistical comparisons between grazed and ungrazed areas would then be conducted to determine the impacts of cattle grazing.

2.2.4.3 Constrained Dispersal

As described under the No-Action Alternative, research on constrained dispersal would be conducted to determine the effectiveness of allowing translocated tortoises to establish home ranges and become part of the social hierarchy within the fenced area before fencing is removed. The constrained dispersal areas would occur over several smaller sites under the No-Action Alternative, but would be limited to a single, larger site at the Cleghorn Lake recipient site under Alternative 1. At 2,321 acres (939 ha), the Cleghorn Lake recipient site offers adequate room to better accommodate tortoise home ranges. Further, removing constrained dispersal pens from other recipient sites reduces constraints on tortoise movement within those sites.

2.2.4.4 Physical and Genetic Distance

Recipient site locations were selected based on criteria discussed in the Translocation Plan, and designed primarily to support successful translocation. However, varying distance between capture and release locations provides an opportunity to study the effects of this physical and genetic distance. Using data collected during monitoring (see Section 2.2.1.3), a comparison among the controls and translocatees would be used to determine patterns of mixing or segregation. Having the deoxyribonucleic acid (DNA) samples from the tortoises would also allow testing whether clutches produce offspring that are segregated or mixed among the WEA, SEA, and residents, and quantify the amount of mixing. These tests would occur at about 3 years post-translocation, after tortoises have had time to settle. Alternative 1 includes this research, although the shorter translocation distances are likely to be less distinct genetically and more difficult to distinguish offspring from either parent population.

2.2.4.5 Vertical Transmission of Disease

Insufficient numbers of tortoises with abnormal nasal discharge were found during baseline and clearance surveys to support study of the vertical transmission of disease. Alternative 1 eliminates this potential research from further consideration.

2.2.4.6 Headstart Program

The Combat Center is holding, protecting, and feeding 285 small, WEA and SEA tortoises at the TRACRS headstart facility because these tortoises are too small to receive radio transmitters and would be nearly impossible to find again in subsequent clearance surveys. The Combat Center is researching the efficacy of headstarting using long-term efforts and may supplement these data by monitoring the

survivorship, growth, and health of these small tortoises held for translocation. Little is known of the survivorship of juvenile tortoises, and these data for small tortoises would provide a comparison to the wild juvenile translocatees, residents, and controls being monitored as part of translocation.

2.3 ALTERNATIVE 2 (PREFERRED ALTERNATIVE)

Alternative 2 was developed based on internal USFWS development of draft revised translocation guidance (USFWS 2016a). Specifically, there was an increased focus on augmenting depleted tortoise populations. The USFWS translocation guidance includes the following additional site selection criteria:

- Release sites support habitat suitable for all desert tortoise life stages.
- There is no evidence of an active outbreak of disease, such as high prevalence of clinical signs of disease or seropositive responses to disease agents within the release sites.
- Major, unfenced roads or highways are no closer than 4.0 miles (6.5 km) to the release site.
- The site has no detrimental rights-of-way or other encumbrances.
- The site will be managed compatibly with continued desert tortoise occupancy.

Alternative 2 would be the same as Alternative 1 with the following exceptions:

- The Bullion recipient site and the associated 3.8 miles (6.2 km) of fenceline would not be established (because the population is not depleted as defined by USFWS), so there would be five recipient sites and six control sites (Table 2.3-1 and Figure 2.3-1).
- Cleghorn recipient site would be paired with two control sites: Bullion and Cleghorn (Table 2.3-1).
- The Bullion control site (Figure 2.3-2) would be located on the Combat Center in the Special Use Area immediately north of Cleghorn Lakes Wilderness Area (instead of in the northwest portion of the Cleghorn Lakes Wilderness Area under Alternative 1). This site has good habitat quality and is adjacent to the Cleghorn Lakes Wilderness Area and is far from any human impacts. The Bullion control site would be in a Category 1 restricted use Special Use Area and entirely within the jurisdiction of the DON/Marine Corps for Alternative 2.
- Density research would investigate the effects of post-translocation densities in recipient sites. The proposed densities under Alternative 2 have changed compared to Alternative 1 and are provided in Table 2.3-2. This density treatment provides replication of tortoise densities that may support a more robust data analysis of the density treatment. However, this approach provides a less continuous treatment of density. Post-translocation densities are set at 14.3 tortoises per square mile (5.5 per km²) (Siberia and Broadwell), 21.3 tortoises per square mile (8.2 per km²) (Lucerne-Ord and Rodman-Sunshine Peak North), and 27.0 tortoises per square mile (10.4 per km²) (Cleghorn). These represent increases of between 8% and 112% over current densities, and increases of between 34% and 164% over near-term projected densities. As indicated in Table 2.3-2, these post-translocation densities have been modified from those proposed under Alternative 1 (see Table 2.2-3).

Table 2.3-1. Recipient Sites and Paired Control Sites for Alternative 2

Recipient Site	Size (acres)	Closest Distance from Impact Area (miles) ³	Paired Control Site 1	Size (acres)	Distance between Recipient Site and Paired Control Site 1 (miles) ¹	Paired Control Site 2 (If Applicable)	Size (acres)	Distance between Recipient Site and Paired Control Site 2 (miles) ¹
Lucerne-Ord	37,619	10.4	Rodman-Sunshine Peak South	13,563	11.4	Daggett	6,183	12
Rodman-Sunshine Peak North	26,078	4.9	Rodman-Sunshine Peak South	13,563	3.2	Daggett	6,183	23
Siberia ²	13,399	16.7	Ludlow	3,054	2.9	NA	NA	NA
Broadwell	10,121	19.2	Calico	1,994	3.6	NA	NA	NA
Cleghorn	2,321	0.5	Cleghorn Control	1,964	0.7	Bullion Control	2,136	3.9

Legend: NA = Not Applicable.

Notes: ¹ This is the distance from the nearest edge of the Release Area within the individual Recipient Sites to the nearest edge of the Control Site.

² Value represents the 62% of the 21,612 acres that has a habitat suitability index of 0.6 or greater, derived from Barrows et al. (2016).

³ This is the distance from the nearest edge of the Release Area within the individual Recipient Sites to the nearest edge of the impact areas.

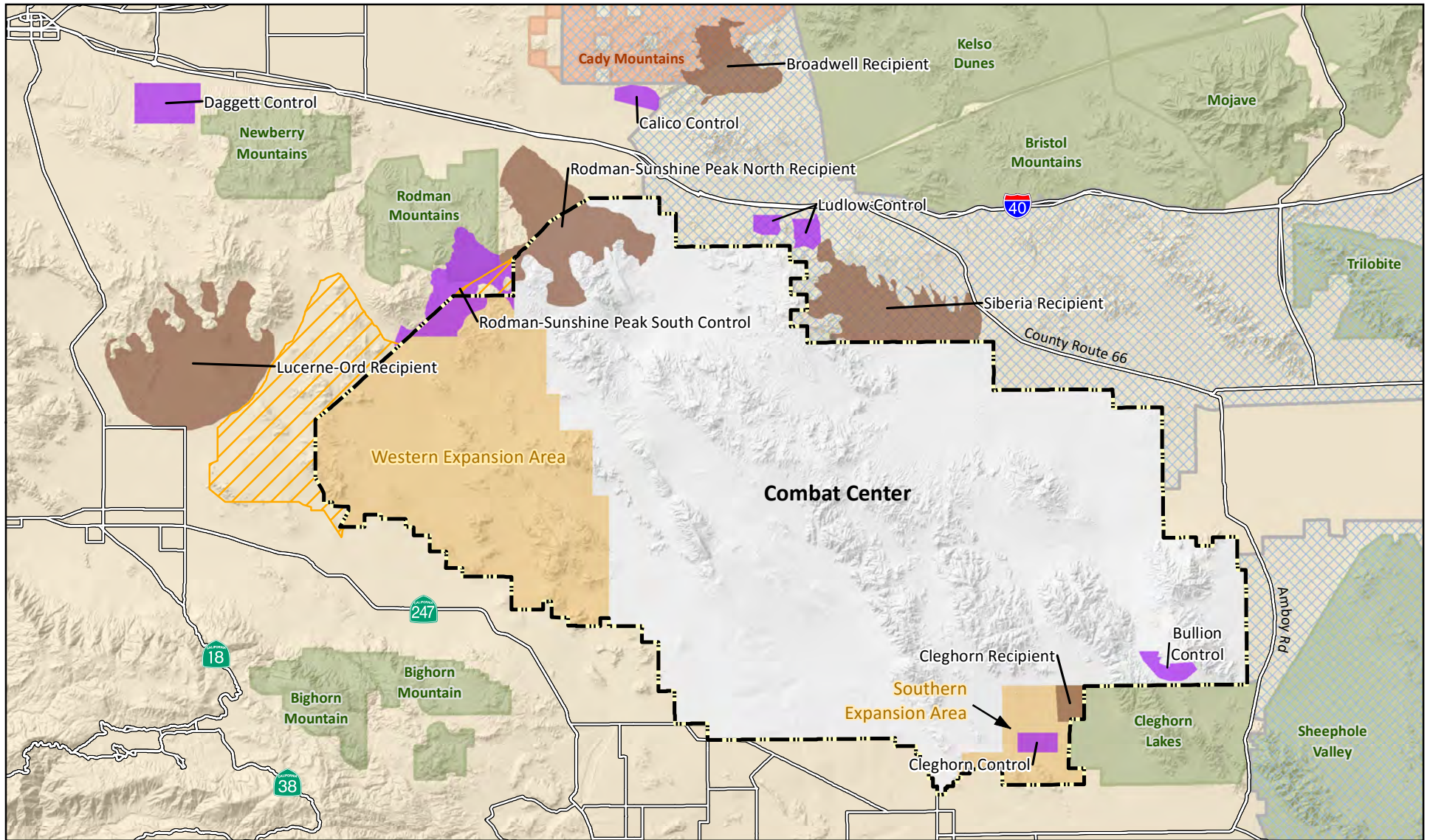


Figure 2.3-1. Recipient and Control Sites under Alternative 2



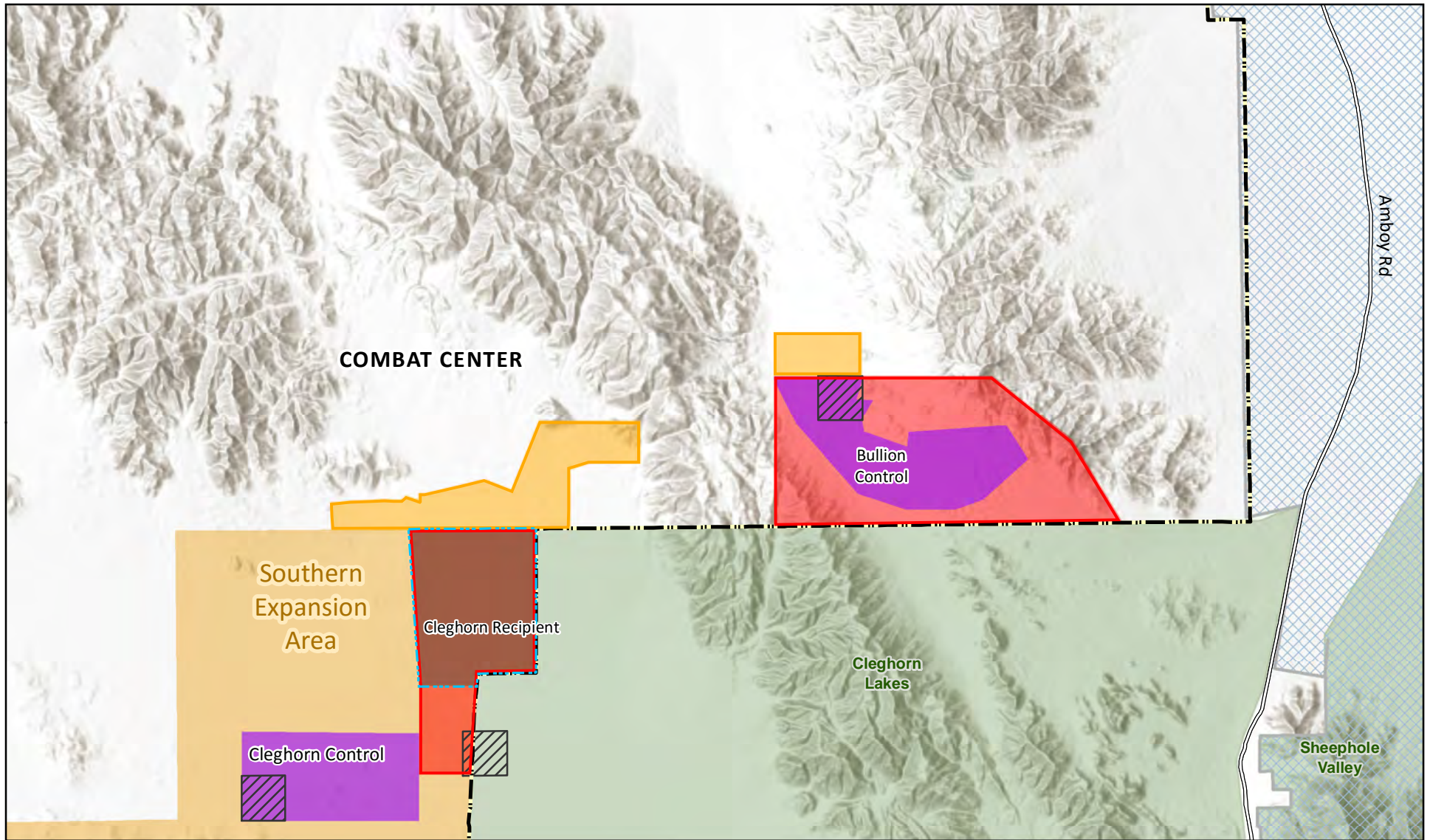


Figure 2.3-2. Detailed View of Recipient and Control Sites within and East of the Southern Expansion Area under Alternative 2

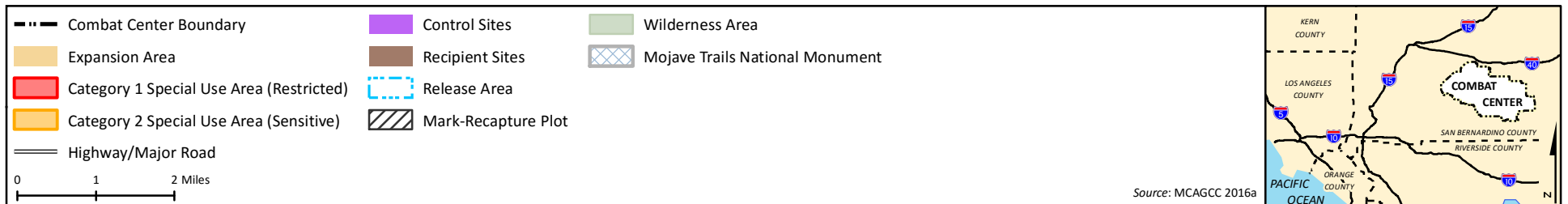


Table 2.3-2. Recipient Sites Post-Translocation Densities for Alternative 2

Alternative 2 Recipient Site	Initial Density (tortoises per km ²)	Projected Density (tortoises per km ²) ¹	Planned Number of Translocatees	Post-Translocation Density (tortoises per km ²)
Lucerne-Ord	5.2	4.0	447	8.2
Rodman-Sunshine Peak North	4.9	3.8	341	8.2
Siberia ²	2.6	2.1	155	5.5
Broadwell	5.1	4.1	18	5.5
Cleghorn	6.5	5.2	37	10.4

Legend: km² = square kilometers.

Notes: ¹ Based on draft USFWS translocation guidance (USFWS 2016a); assumes an 8.3% decrease per year for the Lucerne-Ord and Rodman-Sunshine Peak recipient sites and a 7.1% decrease per year for remaining sites over 3 years.

²Value represents the 62% of 21,612 acre site (13,399 acres) that has a habitat suitability index of 0.6 or greater, derived from Barrows et al. (2016).

Recipient and control sites (see Figures 2.2-2 and 2.2-3), translocation methods, post-translocation monitoring, and additional research under Alternative 2 would be the same as those described in Alternative 1.

2.4 COMPARISON OF ALTERNATIVES

Under the No-Action Alternative, the Marine Corps would conduct translocation of desert tortoises at recipient areas as identified in the 2011 GTP and the Land Acquisition BO. The 2011 GTP was developed to provide for translocating tortoises from the training areas in the WEA and SEA to recipient areas located within or adjacent to the Combat Center. The No-Action Alternative would include several recipient and control areas and identifies translocation methods, post-translocation monitoring, and other research that would provide important information on desert tortoise recovery methods. As outlined in the 2011 GTP, the Combat Center has since conducted a 3-year program of surveys, literature review, and consultation with resource agencies, resulting in the preparation of a desert tortoise translocation plan in March 2016 (Alternative 1), which was further developed in June 2016 (Alternative 2) based on internal USFWS development of draft revised translocation guidance (USFWS 2016a).

Alternatives 1 and 2 primarily differ from the No-Action Alternative in the selection of recipient and control areas/sites and in the distribution of desert tortoises at each recipient area/site. Compared to the No-Action Alternative, Alternatives 1 and 2 would also include additional research studies and reflect updated information obtained from the 3-year program of surveys conducted since the 2012 Final EIS.

Alternative 2 differs from Alternative 1 in that one less recipient site would be used, the pairing of control sites to one recipient site would be different, the Bullion control site would be located on the Combat Center instead of within the Cleghorn Lakes Wilderness Area, and translocation densities would be different. It should be noted that the Siberia recipient site has undergone substantial, recent natural disturbance from unusual flood events. This has created a mosaic of habitat intermixed with scoured areas with little habitat value. This aspect of the Siberia recipient was considered when determining the number of desert tortoises that would be translocated to the Siberia recipient site. Barrows et al. (2016) found that the wash areas at the Siberia site were generally not high quality habitat. Therefore, in consultation with USFWS, a habitat suitability index threshold of 0.6 (Barrows et al. 2016) was used as a basis for excluding the scoured areas from available habitat calculations.

Alternatives 1 and 2 are being carried forward for analysis, along with the No-Action Alternative. A comparison of these alternatives is provided in Table 2.4-1. The 2011 GTP and the March and June desert tortoise translocation plans are provided in Appendix A.

Table 2.4-1. Comparison of Alternatives

Component	No-Action Alternative	Alternative 1	Alternative 2
General Project Features			
Translocation	Translocation would occur as described in Section 2.1.2.3.	Similar to the No-Action Alternative, but with (1) different recipient and control sites; (2) different post-translocation densities; and (3) use of transport by helicopter to reduce transportation time and stress.	Similar to Alternative 1, but with (1) a small difference in recipient and control sites; and (2) different post-translocation densities.
Fencing	Fencing would be installed as described in Section 2.1.2.2.	Similar to the No-Action Alternative except (1) fence locations would vary according to changes in recipient sites; and (2) permanent three-strand perimeter fence in specific locations (see Section 2.2.2.2).	Similar to Alternative 1 except no fence would be installed at the southern edge of the Bullion Training Area.
Subsequent Clearance Surveys	Same for all alternatives.	Same for all alternatives.	Same for all alternatives.
Post-Translocation Monitoring			
Monitoring	Post-translocation monitoring would focus on monitoring survival, threats to survival, habitat stability/changes, and health and disease.	Post-translocation monitoring is generally consistent with that described in the No-Action Alternative with the following exception: <ul style="list-style-type: none"> Implement tortoise predator control measures. 	Same as Alternative 1.
Other Research			
Experimental Translocation Densities	Research would be implemented with densities up to 22.5 tortoises per km ² .	Research would be implemented with densities up to 13.2 tortoises per km ² .	Research would be implemented with densities up to 10.5 tortoises per km ² .
Grazing	Grazing occurs; research would not be implemented.	Grazing occurs; research would be implemented at the Lucerne-Ord Recipient Site.	Same as Alternative 1.
Constrained Dispersal	Research would be implemented in four to six small constrained dispersal pens.	Research would be implemented in a single, larger site at the Cleghorn recipient site.	Same as Alternative 1.
Physical and Genetic Distance	Not Considered.	Research would be implemented for all release sites.	Same as Alternative 1.
Vertical Transmission of Disease	Research would be implemented on vertical transmission of disease.	Research eliminated from further consideration.	Same as Alternative 1.

Table 2.4-1. Comparison of Alternatives (continued)

Component	No-Action Alternative	Alternative 1	Alternative 2
Headstarting	Not Considered.	Research would be implemented at the TRACRS headstart facility.	Same as Alternative 1.
Land Use Overlap (acres): Recipient¹			
Wilderness Areas	0	0	0
Wilderness Study Areas	0	3,672	3,672
Mojave Trails National Monument	0	31,699	31,699
Grazing Allotment	17,355	12,189	12,189
Land Use Overlap: Control^{1,2}			
Wilderness Areas	4 Control Areas	6,397	4,387
Wilderness Study Areas	0 Control Areas	0	0
Mojave Trails National Monument	0 Control Areas	3,301	3,054
Grazing Allotment	2 Control Areas	9,485	9,485

Legend: km² = square kilometer; OHV = Off-Highway Vehicle; RTA = Range Training Area; SEA = Southern Expansion Area; TRACRS = Tortoise Research and Captive Rearing Site; WEA = Western Expansion Area.

Notes: ¹ Includes Recipient or Control Areas for the No-Action Alternative and Recipient or Control Sites for Alternatives 1 and 2.

² Control Area boundaries were not determined in the 2011 GTP, so acreage of overlap cannot be calculated. Overlap with specific land uses is reported in terms of the number of control areas that intersect these land uses.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

During the planning process for this SEIS, the Marine Corps considered and then eliminated from further analysis the following potential action alternatives because they would not meet the purpose of and need for the proposed action or were otherwise not reasonable. Reasonable alternatives would include those that are practical or feasible from a technical Marine Corps training perspective and that are viable from an economic standpoint. Alternatives eliminated from further analysis and the rationale for elimination are described below.

2.5.1 No Training and No Translocation on Acquired Land

The Marine Corps considered an alternative for this SEIS that would not include military training on acquired lands in the WEA and SEA, and would therefore not require any desert tortoise translocation. A variation of this alternative (including no land acquisition or airspace establishment along with no MEB-sized training exercises) was described and evaluated as the No-Action Alternative in the 2012 Final EIS. The No-Action Alternative was not selected by the DON in the 2013 ROD, primarily because it would not have fulfilled the Marine Corps' requirement to provide sustained, combined-arms, live-fire, and maneuver field training for MEB-sized MAGTFs (consisting of three battalion task forces and associated command and support elements).

In December 2013, Congress passed and the President signed the FY 2014 NDAA (Public Law 113-66), which withdrew approximately 150,928 acres (61,079 ha) of public land for military training use at the Combat Center, including approximately 78,933 acres (31,943 ha) for exclusive military use in the WEA, approximately 18,704 acres (7,569 ha) for exclusive military use in the SEA, and approximately 53,231 acres (21,541 ha) for shared use in the WEA (Subtitle C, Section 2941 of the NDAA). Specifically, Congress identified the purposes for the two EMUAs as the following: (1) sustained, combined-arms, live-fire, and maneuver field training for MEB-sized MAGTFs; (2) individual and unit live-fire training ranges; (3) equipment and tactics development; and (4) other defense-related purposes that are consistent with the above purposes and/or authorized under Section 2914 of the NDAA (changes of use of withdrawn lands specified by the Secretary of the Navy for defense-related purposes). Given that the land withdrawals have since been completed, and most of the additional private and State lands associated with the 2012 Final EIS have been acquired, the further analyzing of the No Training/No Translocation alternative in this SEIS would be contrary to the specific purpose for which the lands have been withdrawn by an Act of Congress. Under such an alternative, since no military training activities would occur on the withdrawn and acquired lands, there would be no need for, or implementation of, any tortoise translocation because the tortoises and their habitat would not be affected from such training activities.

Under a No Training/No Translocation alternative, the Marine Corps would not be able to fulfill key requirements of National Security Strategy, National Military Strategy, and joint services doctrine calling for capabilities across the full spectrum of operations. The resultant Marine Corps commitments and training requirements developed in response to such strategic guidance would be similarly unfulfilled. Section 1.3 of the 2012 Final EIS described these commitments and requirements in detail; the following highlights key points:

- The National Security Strategy of 1995 announced a major shift in the national security environment from specific Cold War-related threats to threats from a wide range of potential adversary capabilities arising from a large variety of potential sources (The White House 1995).

- National Military Strategy and joint services doctrine responded by embracing the concept of full-spectrum capabilities, a concept that served to broaden the definition of the range of military-operations requirements. This broadened definition in turn required a respective increase in military capabilities.
- To set the conceptual framework to provide for these capabilities, service-level strategic guidance was revised. The Marine Corps published its revised strategic guidance in *Marine Corps Strategy 21* in 2000 (DON 2000). This strategy identifies the MEB as the “premier response force for smaller-scale contingencies...” The role of MEBs was changed and elevated to such a degree that a full review of what MEBs should train for and how they should train was undertaken (MAGTF Training Command 2008).
- In addition to the above, the employment of MEBs in an ad hoc manner at the outset of the Afghanistan and Iraq wars, along with a determination that MEBs would be the primary contingency response force (DON 2000), made it apparent that the MEB-sized MAGTF must be capable of a wider range of operations and must be more expeditionary and ready than in the past.
- Along with “Building Block” training events designed to prepare individuals and subordinate units for deployment, a comprehensive field training exercise would be necessary to integrate all units, build cohesiveness, exercise a wider range of capabilities, and provide the increased readiness that was now required of a MEB (Center for Naval Analyses 2004a).
- A Report to Congress in February 2004 (Office of the Secretary of Defense 2004) noted that “Marine Corps Strategy 21 and Expeditionary Maneuver Warfare describe and define the Marine Corps’ mission to provide combatant commanders with scalable, interoperable, combined arms MAGTFs that can quickly deploy and operate in an expeditionary environment across the spectrum of conflict.” It also noted that “the MEB is the Marine Corps’ primary contingency response force and is the smallest MAGTF capable of forcible entry operations.” More significantly, it noted that “the Marine Corps does not have a range capable of supporting MEB-sized fire and maneuver combined-arms exercises.”
- The 2004 Report to Congress indicated that the Marine Corps’ existing training bases, facilities, ranges, and live-fire ground and air maneuver areas were inadequate to support MEB-sized training requirements. The largest training site in the Marine Corps inventory, the Combat Center at Twentynine Palms, could effectively accommodate (before FY 2014 NDAA land withdrawal) sustained combined-arms, live-fire, and maneuver training for only two battalions. To complicate this deficiency, new weapons systems have expanded the joint battle space by: (1) increasing target engagement distances, (2) improving speed and mobility of forces, and (3) enhancing the Marine Corps’ overall ability to shape the battle space. These improved systems must be incorporated into MEB-sized MAGTF training exercises and in a manner that maximizes their capabilities (MAGTF Training Command 2008).

As summarized in the 2012 Final EIS, MEBs must be capable of performing a variety of missions throughout the spectrum of conflict because they can be expected to encounter complex situations containing asymmetric threats, nonlinear battlefields, and unclear delineation between combatants and non-combatants. To overcome these challenges and operate effectively, MEBs must be able to conduct maneuver-intensive operations over extended distances, supported by closely coordinated precision fires, aviation-delivered ordnance, and sustained, focused logistical support. Large-scale MAGTF training currently relies on classroom instruction, command post exercises, and simulation to accomplish staff

training requirements. These methods offer limited practical experience and cannot provide realistic training opportunities that enhance the capability to rapidly and effectively integrate all elements of the large-scale MAGTF into a single cohesive force. The task of successfully integrating all elements of a MEB to produce an effective, joint interoperable war-fighting organization can most effectively be accomplished through realistic training that replicates operating conditions these units are likely to encounter. Furthermore, the experiences in every major armed conflict in which the U.S. has been involved since World War II clearly illustrate why realistic training is critical for keeping pace with weapons and combat evolution and in achieving success in all phases of warfare. Realistic training is critical to the planning, design, and engineering of weapons systems and tactics for combat. The extent to which deficiencies in equipment or tactics can be discovered, and skills developed, in realistic training rather than battle pays great dividends in terms of lives saved and combat effectiveness. These advantages of realistic training and mission preparedness would not be realized under the No Training/No Translocation alternative, and the traditional Marine Corps doctrine to “train as we fight” would not be maintained.

The Combat Center would continue to support other ongoing Combined Arms Exercise programs and training for at most two battalions (as well as smaller units and individual Marines), but the Marine Corps would be unable to adequately train MEB-sized MAGTFs, resulting in unacceptable deficiencies in mission readiness and capabilities at the MEB level. A MEB-sized MAGTF training environment has both operational and tactical requirements to fully support sustained, combined-arms, live-fire, and maneuver training. In addition, operational responsibilities that allow the Marine Corps to manage multiple battles over large space and time are required. However, under the No Training/No Translocation alternative, these requirements would not be met. Furthermore, tactical MEB training area considerations associated with the training audience and the tactical functions required of the training environment would not be supported. At present, the geography at the Combat Center channelizes individual battalions and separates multiple battalion movement and maneuver. Additionally, battalions must reposition after 12 to 24 hours of training due to the limited length of corridors. Implementation of the No Training/No Translocation alternative would not support realistic full-unit ground maneuver and fires training for the required three battalion MEB-sized MAGTF, and would not allow the Marine Corps to effectively improve the capabilities and readiness of its MEBs to defend the interests of the U.S. and its allies in the 21st century.

In addition to the above considerations, the No Training/No Translocation alternative would not meet the purpose of and need for the proposed action in this SEIS, which is to study alternative translocation plans in support of the project described in the 2012 Final EIS, selected in the 2013 ROD, and authorized by the NDAA. The new information and conditions that led to the DON’s decision to prepare this SEIS (see Section 1.1) are associated solely with the consideration and implementation of one of the alternative tortoise translocation plans developed to protect the local tortoise population from training impacts, as required by the 2012 BO.

The implementation of MEB-sized training and other required training activities on acquired lands at the expanded Combat Center is not reevaluated in this SEIS because it was already evaluated and decided upon in the 2012 Final EIS, the 2013 ROD, and the Congressional action taken in the FY 2014 NDAA; because such training is essential to national security and military preparedness, and because such training cannot be feasibly accomplished in any other location. Based on all of the considerations described above, an alternative involving no training and no translocation on acquired lands is eliminated from further consideration in this SEIS.

2.5.2 Training on Acquired Lands but without Translocation

The Marine Corps considered an alternative for this SEIS that would involve training on acquired lands without translocating desert tortoises out of the medium- and high-intensity MEB operating areas in the WEA and SEA. Based on clearance surveys conducted in 2014 and 2015, an estimated 998 adult tortoises and 497 juveniles are located within these areas (MCAGCC 2016b, c) and would be initially impacted if tortoise translocation were not implemented. Figure 2.5-1 shows desert tortoise densities within the medium- and high-intensity MEB operating areas. Furthermore, over time desert tortoises from outside these areas would potentially move into the medium- and high-intensity MEB operating areas from adjacent lands. Over the 30-year term of the project, it is estimated that a total of approximately 1,105 adult tortoises and 2,100 juveniles would be potentially affected by the training activities (DON 2011). This represents 34% of the adult tortoises and 23% of the juveniles that are estimated to inhabit the entire WEA and SEA (DON 2011).

As described in the 2012 Final EIS, wheeled and tracked vehicles would potentially crush tortoises during vehicle convoys and in staging and assembly areas. Tortoises could also be crushed or buried as a result of temporary construction, excavation and earth-moving activities, temporary bivouacs, helicopter landings, ordnance employment, and the movement of Marines on foot. The 2012 Land Acquisition BO found that these military training activities would not be compatible with the continued existence of tortoises in the medium- and high-intensity MEB operating areas in the expansion areas (USFWS 2012). Desert tortoises have experienced long-term and severe declines throughout their geographic range in the past two decades (MCAGCC 2016b, c). As such, further long-term losses of over 1,000 breeding age tortoises and 2,000 smaller tortoises would further compromise species recovery. For this reason, the USFWS required, and the Marine Corps agreed, that tortoises should be translocated to prevent such losses (USFWS 2012). The 2012 Land Acquisition BO also required that clearance surveys and translocation efforts continue to be implemented over time to periodically translocate any additional desert tortoises found in medium- and high-intensity impact areas to prevent injury and/or mortality to these tortoises from future training activities. This additional requirement would apply until such time that fewer than three desert tortoises are found in any square-kilometer grid.

An alternative involving training without translocation would result in a loss of tortoises and tortoise habitat that is not compatible with recovery of this threatened species (DON 2011) and would not satisfy the measures outlined in the 2012 Land Acquisition BO or the 2013 ROD. That is, because injury or mortality to an estimated 998 adult tortoises and 497 juveniles (near-term) due to anticipated training would substantially exceed the take limit of 20 individuals per calendar year authorized in the 2012 Land Acquisition BO. Furthermore, desert tortoise translocation is considered a reasonable and prudent measure to reduce impacts to the desert tortoise, and by not performing translocation, the USFWS may conclude that training on acquired lands is reasonably expected to diminish desert tortoise numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced (i.e., a “jeopardy” opinion). Because such impacts would be unacceptable, a jeopardy opinion would require the Marine Corps to essentially abandon current plans to train on newly acquired land, disrupt training, and impact readiness. Translocation is necessary to maintain tortoise abundance and genetic integrity to support the continued existence of this population. Based on all of the considerations described above, an alternative involving training on acquired lands without translocation is eliminated from further consideration in this SEIS.

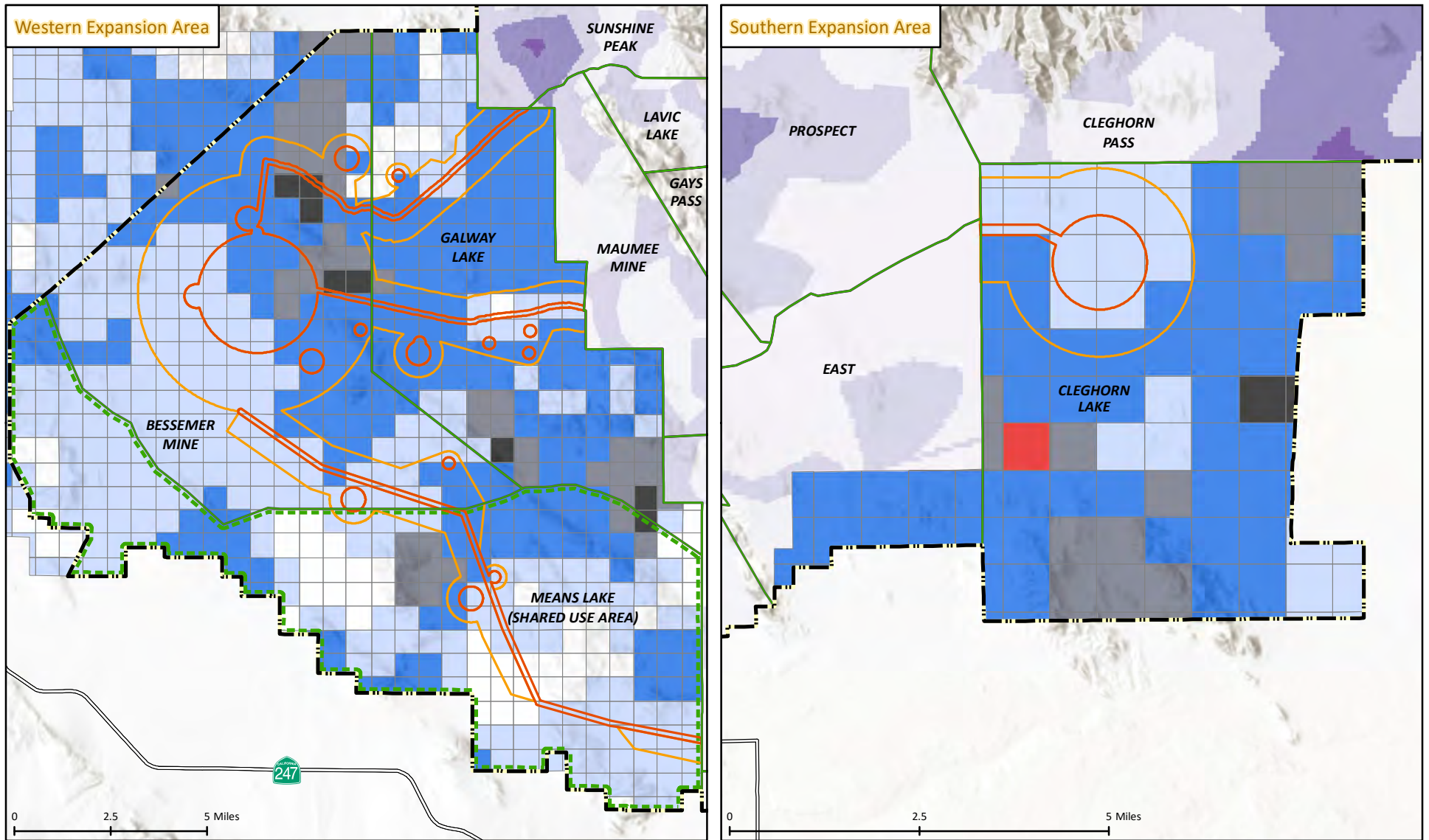
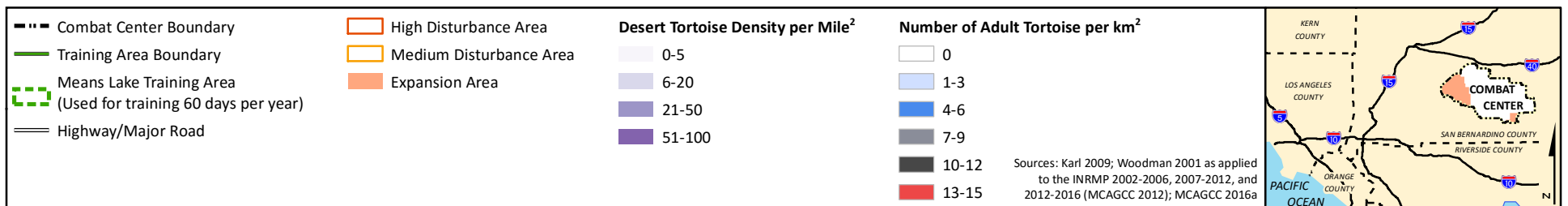


Figure 2.5-1. Impacts to Desert Tortoises in the Expansion Areas



2.6 SPECIAL CONSERVATION MEASURES

Mitigation is an important mechanism federal agencies can use to minimize the potential adverse environmental impacts associated with their actions. Agencies can use mitigation to reduce environmental impacts in several ways. As defined in 40 CFR § 1508.20, mitigation includes:

- Avoiding an impact by not taking a certain action or parts of an action;
- Minimizing an impact by limiting the degree or magnitude of the action and its implementation;
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating an impact over time, through preservation and maintenance operations during the life of the action; and
- Compensating for an impact by replacing or providing substitute resources or environments.

Many federal agencies rely on mitigation to reduce adverse environmental impacts as part of the planning process for a project, incorporating mitigation as integral components of a proposed project design before making a determination about the significance of the project's environmental impacts. Such mitigation can lead to an environmentally preferred outcome and in some cases reduce the projected impacts of agency actions to below a threshold of significance. Such measures are often incorporated into the proposed action, as part of the planning process, such as agency standardized best management practices (BMPs) (e.g., to prevent storm water runoff or fugitive dust emissions at a construction site). For the purposes of this SEIS, such measures are referred to as SCMs. The SCMs would be included in the project design and, as an integral component of the proposed action, would be implemented with the proposed action. The CEQ regulations also require inclusion of mitigation measures, which are not already included as part of the proposed action. Such mitigation is distinct from SCMs as they represent additional measures, beyond the proposed action, that are being considered for further reducing, avoiding, and/or compensating for adverse effects outlined in this EIS. SCMs and mitigation measures are summarized below.

The SCMs presented in this section would be included in the proposed action to avoid or minimize potential impacts.

2.6.1 General Measures

1. A contract requirement would be to include BMPs to minimize potential impacts to surface water from construction activities (such as the use of hay bales or other barriers around excavation areas to trap sediment and prevent mobilization by surface water runoff; covering piles of excavated soil before the soil is backfilled into the trenches; proper procedures for contractors' laydown areas and equipment to prevent accidental fuel releases, etc.). NREA personnel at the Combat Center would be required to inspect the construction sites and ensure that the contractor is complying with the BMPs.
2. All petroleum, oil, lubricants, and hazardous wastes/hazardous materials associated with the construction and inspection phases of the project would be used, stored, managed, and disposed of in accordance with all applicable federal, state, and local regulations and the Marine Corps Order P5090.2A (Environmental Compliance and Protection Manual [DON 2013]).
3. Another contract requirement would be the preparation of a project-specific Health and Safety Plan according to all federal, state, local and Marine Corps regulations and requirements. The

Health and Safety Plan would identify potential safety hazards associated with the construction and inspection phases of the alternatives, and measures for preventing and minimizing them. The Health and Safety Plan would address such issues as safe heavy equipment operation and fueling; properly signing/flagging work areas; traffic control; backfilling all trenches at the end of the workday; securing equipment left onsite; slips, trips and falls; overhead hazards; and potential biological hazardous such as ticks, scorpions, and venomous snakes.

4. NREA and its contractors would be required to contact the MCAGCC Public Works Officer to locate all on-base underground utilities within the proposed fence alignment, and Underground Service Alert of Southern California (DigAlert) for the locations of all long-distance, commercial underground utility corridors while the project is in the design stage. The fenceline would be routed to avoid intersecting underground utilities in the project areas. If the fence alignment must cross over an underground utility, such as an underground natural gas transmission pipeline, the following procedures would be implemented to prevent contact with and damage to the underground utility:
 - 4.1 Utility company representatives would meet at the site with design/engineering staff. The utility company personnel would flag or otherwise mark at the surface the width of the underground utility corridor where the fenceline would cross. GIS coordinates would be recorded for width of the underground utility at each the location where the fenceline would cross the utility.
 - 4.2 Project staff would design that segment of the fenceline such that the t-posts would be placed with a 2 ft (0.6 m) buffer on either side of the utility corridor.
 - 4.3 Project engineers/designers and utility company personnel would be on-site when t-posts are installed to provide direction to t-post installers to ensure that the utility line is avoided. GIS coordinates would be recorded for each t-post installed at either side of a utility corridor.
 - 4.4 Where the fence must cross an underground over an underground utility corridor, no trench would be excavated. Instead, the fence materials would be bent at a 90 degree angle to produce a lower section approximately 14 inches (35 cm) wide that would be placed parallel to, and in direct contact with, the ground surface (USFWS 2009). The remaining 22 inch (55 cm) wide upper section would be placed vertically against the t-posts, perpendicular to the ground and attached to the t-posts. The lower section in contact with the ground would be placed level with the ground surface and face inward toward the exclusion area (i.e., face toward the direction inside which the tortoises are meant to stay). The fence material on the ground surface would be buried with soil and rocks (rocks approximately 2 to 4 inches [5 to 10 cm] in diameter; larger rocks may be used where soil is shallow) to a depth of up to 4 inches (5 cm). A minimum of 18 inches (76 cm) of height space would be left between the rock surface and the top of the tortoise-proof fence (USFWS 2009). During the inspection phase, in the event that a t-post is found to be displaced, the GIS coordinates from the original installation would be used to ensure that the replacement is installed a safe distance from the underground utility.
5. The translocation plan anticipates that some recipient sites would be on lands managed by BLM. The following Stipulations would be employed on lands administered by BLM.

- 5.1 The Marine Corps would survey proposed helicopter landing sites for desert tortoises before use. All landing sites would be placed at least 100 ft (30 m) from any existing desert tortoise or burrow. Desert tortoises that enter an established landing site would be moved at least 100 ft (30 m) from activity within that site by an Authorized Biologist.
- 5.2 The Marine Corps would protect all survey monuments found within the right-of-way.
- 5.3 All vehicular traffic would be limited to routes that have been designated “open” (signed) by BLM. New access roads or cross-country vehicle travel would not be permitted. Use of any routes not designated “open” (signed) would not be utilized.
- 5.4 Before any helicopter landings, the Marine Corps would develop, and BLM would approve, an Aviation Safety Management Plan that would specifically address how potential conflicts between helicopter use and other area users would be resolved.
- 5.5 Before any helicopter landings, the Marine Corps would develop, and BLM would approve, a Spill Prevention Plan to address contingencies should a fuel spill occur. Fueling on public lands would not be authorized.

2.6.2 Biological Resources

Three SCMs are proposed as part of the project to offset impacts to desert tortoises and desert tortoise habitat. These measures have been developed by the NREA Division at the Combat Center in consultation with the USFWS and are described in detail below.

6. An Authorized Biologist would be present during all fence installation activities to ensure that placement of the fence would adaptively avoid protected and special status biological resources (e.g., flora and fauna species) and long-lived woody vegetation.
7. Regular fence inspections (as described in Section 2.1.2.2, *Fencing*) would include monitoring and removal of any soil and plant debris that might collect at the fence.
8. In instances where desert tortoise eggs are translocated, nests would be protected with open-mesh fencing that permits hatchlings to escape but prevents predation by dogs/coyotes that might be attracted by human scent to the new nests. Alternatively, smaller mesh fencing or other techniques may be used to prevent ground squirrel predation on nests. Open-mesh fencing or avian netting also would be installed on the roof of the nest enclosure to prevent predator entry. Nests covered in material that would not allow hatchlings to exit would require monitoring from a 30 ft (9 m) distance for hatching activity. If possible, and following the Desert Tortoise Field Manual (USFWS 2009), hatchlings would be weighed, measured, photographed, described, and marked.

In addition, numerous standard or currently implemented SCMs would continue to be implemented. These are described in the 2012 Final EIS; the following discussion focuses on SCMS that are relevant to the proposed action that are not already incorporated into Sections 2.1, 2.2, or 2.3.

9. Upon issuance of the BO for the proposed project, the Combat Center would amend its Integrated Natural Resources Management Plan (INRMP) to incorporate the conditions for use associated with the new training areas and new/modified airspace.
10. The following measures from the 2002 Basewide BO (USFWS 2002), the 2012 Land Acquisition BO (USFWS 2012), the 2012 INRMP (MCAGCC 2012), and the current Combat Center Order 5090.4F (MAGTF Training Command 2011a), would be implemented:

- 10.1 The Marine Corps will ensure that personnel inspect beneath and around all parked vehicles, located in desert tortoise habitat, prior to moving the vehicle. If a desert tortoise is located beneath a vehicle and is not in immediate danger or impeding training, the Marines will allow the tortoise to move on its own or they will contact Range Control for instructions. Only appropriately briefed Marines, with direct radio or telephone communication with and authorization from Range Control, will move desert tortoises. In these instances, the Marine Corps will move desert tortoises only the minimum distance to ensure their safety.
- 10.2 During construction in areas that are not fenced with desert tortoise exclusion fencing, an Authorized Biologist will check open trenches at least two times a day, in the morning and evening, throughout the duration of construction. If midday temperatures are likely to be above 95 degrees Fahrenheit, one of these checks will occur one hour prior to the forecasted high temperature. The Marine Corps will leave open excavations only if they are temporarily fenced or covered to exclude desert tortoises. The Marine Corps will inspect all excavations for desert tortoises prior to filling.
- 10.3 If maintenance or construction occurs during a time of year when desert tortoises are active, the Authorized Biologist would ensure that clearance surveys have been conducted in all work areas within appropriate habitat immediately before the onset of work; that is, the clearance surveys would be timed to reduce, to the extent possible, the likelihood that a desert tortoise could move into a work area between the time the site is surveyed and the onset of work. The NREA staff would determine whether desert tortoises are likely to be active with consideration of the time of year and the weather conditions at the time and place where work is to be conducted. If desert tortoises are unlikely to be active, the clearance surveys may be conducted within 48 hours before ground disturbance. When desert tortoise burrows are found, they would be checked for desert tortoises; when desert tortoises are found, the burrows would be flagged. All unoccupied burrows would be flagged in a different manner than the occupied burrows. During the construction period, an Authorized Biologist would re-check the burrows and remove any desert tortoises that would be in danger by the mission-related construction activity.

Reporting Procedures (Adapted from the 2012 Land Acquisition BO and the 2002 BO)

- 10.4 The NREA office would maintain a record of all observations of desert tortoises encountered at the Combat Center. The information gathered would include the date and time of observation; whether the desert tortoise was handled and whether it voided its bladder; general health of the desert tortoise; and, if it was moved, the locations from and to which the desert tortoise was moved.
- 10.5 The Marine Corps would provide a written report to the USFWS by January 31 of each year, to document the numbers and locations of desert tortoises injured, killed, and handled; discuss the effectiveness of the Marine Corps' protective measures; and recommend other measures that allow for better protection of the desert tortoise or more workable implementation. The report would also include detailed information on the construction and maintenance projects that NREA personnel reviewed in the previous year; these projects include any actions that NREA staff determines are not likely to

adversely affect the desert tortoise and those that are likely to adversely affect the desert tortoise and that are conducted under the auspices of a BO.

- 10.6 If the Marine Corps is required to prepare any additional written reports as a result of biological opinions for activities it conducts at the Combat Center, the information from these reports may be included in this annual report.

Disposition of Dead or Injured Desert Tortoises (Adapted from the 2012 Land Acquisition BO and the 2002 BO)

- 10.7 Upon locating dead or injured desert tortoises, initial notification within 3 days of their finding would be made in writing to the Palm Springs Fish and Wildlife Office by telephone (760-322-2070) or electronic mail. The report would include the date, time, and location of the carcass, a photograph (if possible), cause of death, if known, and any other pertinent information.
- 10.8 Care would be taken in handling injured animals to ensure effective treatment. Injured animals would be transported to a qualified veterinarian or a rehabilitator licensed by the State of California. Should any treated desert tortoises survive, the USFWS would be contacted regarding the final disposition of the animals.
- 10.9 The USFWS may advise the Marine Corps to provide the dead specimens to a laboratory for analysis. The carcass of the deceased tortoise must be kept so the biological material remains intact. When possible, the carcass should be kept on ice or refrigerated (not frozen) until the USFWS has provided information on the appropriate means for disposition.
- 10.10 If such institutions are not available or the shell has been damaged, the information noted in the Reporting Requirements section of the 2002 BO would be obtained and the carcasses left in place. Arrangements regarding the proper disposition of potential museum specimens would be made with the institution by the Marine Corps before implementation of the action.

Desert Tortoise Conservation Efforts (Adapted from 2012 Integrated Natural Resources Management Plan)

- 10.11 Manage TRACRS to protect nests and hatchling tortoises from predation.
- 10.12 Monitor tortoise growth and population changes over time to determine facility success.
- 10.13 Continue non-native predator management.
- 10.14 Minimize MSR and road proliferation.
- 10.15 Continue tortoise awareness program.
- 10.16 Cooperate with other agencies and academic institutions on research conducted on the cause, transmission, testing, and treatment of Upper Respiratory Tract Disease.
- 10.17 Evaluate desert tortoise habitat condition and health.
- 10.18 Identify areas of desert tortoise habitat at risk for negative impacts.
- 10.19 Continue long-term tortoise density and trend-monitoring program using USFWS-approved protocols.

- 10.20 Maintain established study plots.
- 10.21 Monitor long-term study plots on a 2- to 4-year rotation.
- 10.22 Restore disturbed washes to allow for proper functioning.
- 10.23 Maintain and delineate road access to sites to discourage units from making alternate routes.
- 10.24 Identify areas where road upgrades or relocations can benefit both military travel and natural resources conservation. Design projects to enhance these roads, encourage their use, and avoid significant impacts to the desert tortoise, including proper drainage work on shoulders and adequate dry wash crossings.
- 10.25 Restore and rehabilitate Training Lands when economically feasible.
- 10.26 Prevent damage to naturally and culturally sensitive areas by making personnel aware that they are entering sensitive areas.

Desert Tortoise Conservation Measures from the Combat Center Order 5090.4F (Adapted from MAGTF Training Command 2011a)

- 10.27 The possession of otherwise legal captive desert tortoises aboard the Combat Center, including base housing, is prohibited. Under no circumstances are legal captive or wild tortoises from off-base to be released into the Combat Center's population.
- 10.28 The feeding of wildlife on the Combat Center is prohibited. Unauthorized feeding of desert wildlife creates an imbalance in the food chain and reduces the animals' natural fear of humans, which places humans, wildlife, and domestic pets at risk.
- 10.29 The introduction of any exotic plant life is prohibited on the Combat Center.
- 10.30 The release of exotic wildlife, domesticated pets, aquatic species, and those vertebrate and invertebrate species not native to the area is strictly prohibited.
- 10.31 Open fires and the harvesting or cutting of any native vegetation are prohibited.
- 10.32 The "Cleghorn Lakes Wilderness Area," located to the south of the Cleghorn Pass, Bullion, and America Mine Training Areas, is managed by the BLM. Accessing or departing the southeastern ranges through this area by vehicle is strictly prohibited. No vehicle entry is allowed in this protected area. There is no authorized access to the Cleghorn Pass, Bullion, or America Mine Training Ranges from a southerly direction.
- 10.33 The "Ord-Rodman Critical Habitat" for desert tortoise and two associated wilderness areas are adjacent to the Sunshine Peak Training Area. No vehicle entry is allowed in these protected areas.

2.6.3 Land Use

The following BLM measures would be implemented as part of the proposed action.

- 11. A BLM Minimum Requirements Analysis would be performed whenever project activities would occur in designated wilderness areas.
- 12. During post-translocation monitoring and related activities, Authorized Biologists would identify vehicle staging areas outside designated wilderness areas (using a Global Positioning System to

ensure awareness of wilderness area boundaries), would enter wilderness areas only on foot, and would vary their ingress/egress routes to control areas and sites so as to avoid leaving evidence of a trail or path into designated wilderness areas.

13. Installation of fencing along (but outside of) boundaries of wilderness areas would, to the maximum extent practicable, make use of colored fence posts that blend in with surrounding terrain and thereby minimize visual impact from within the designated areas.
14. The Marine Corps will not install remote tracking devices (e.g., transmitters) on desert tortoises in wilderness areas or wilderness study areas.

2.6.4 Air Quality

Where applicable during project construction, the Combat Center would implement the following:

15. Use water trucks to keep construction areas and commercial helicopter landing sites during translocation damp enough to minimize the generation of fugitive dust.
16. Minimize the amount of disturbed ground area at any given time.

2.6.5 Cultural Resources

For areas on the Combat Center:

17. The Marine Corps would provide an archaeological monitor to be present for all sign and post emplacement as well as for all trenching for desert tortoise exclusion fencing and the permanent maintenance road. The monitor would ensure that no signs, posts, trenches, or roads would be placed in a manner that would disturb any archaeological site or features.
18. Any new archaeological sites would be recorded and entered into both the NREA's and the State's databases.
19. Construction material laydown areas (located on the new maintenance road) would be restricted to the defined Area of Potential Effects (APE) and placement would be monitored by archaeological monitors to ensure that no cultural resources are disturbed.
20. Site CA-SBR-12950 would be flagged and it would be monitored by a NREA-approved archaeologist to ensure that it is not inadvertently disturbed or affected.

For areas on BLM-managed lands:

21. The Marine Corps would survey proposed helicopter landing sites for cultural resources before use. All landing sites would be placed at least 100 ft (30 m) from any cultural resources.
22. Inadvertent Discovery of Human Remains:
 - 22.1 Upon discovery of human remains, all work within a minimum of 200 ft (61 m) of the remains must cease immediately, nothing disturbed, and the area is to be secured. The County Coroner's Office of the county where the remains were located must be called. The Coroner has two working days to examine the remains after notification. The appropriate land manager/owner or the site shall also be called and informed of the discovery.
 - 22.2 Federal land managers/federal law enforcement/federal archaeologists are to be informed as well because of complementary jurisdiction issues. It is very important that the

suspected remains and the area around them remain undisturbed and the proper authorities called to the scene as soon as possible as it could be a crime scene.

- 22.3 The Coroner would determine if the bones are historic/archaeological or a modern legal case.

23. Modern Remains:

- 23.1 If the Coroner's Office determines the remains are of modern origin, the appropriate law enforcement officials will be called by the Coroner and conduct the required procedures. Work will not resume until law enforcement has released the area.

24. Archaeological Remains:

- 24.1 If the Coroner determines the remains are archaeological or historic and there is no legal question, the appropriate Field Office Archaeologist must be called. The archaeologist will initiate the proper procedures under the Archaeological Resources Protection Act and/or Native American Graves Protection and Repatriation Act (NAGPRA). If the remains can be determined to be Native American, the steps as outlined in NAGPRA, 43 CFR 10.4, *Inadvertent Discoveries*, must be followed.

CHAPTER 3

AFFECTED ENVIRONMENT

This chapter describes the existing environmental conditions in the proposed project area. Information in this chapter establishes a baseline to which the proposed action and alternatives are compared in Chapter 4 to identify and evaluate potential environmental consequences.

In compliance with NEPA, CEQ regulations, DON and Marine Corps procedures for implementing NEPA, the description of the affected environment focuses only on those resources potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of impact. Applying these guidelines to this SEIS, the discussion of the affected environment and associated environmental analysis presented herein focuses on: biological resources, land use, air quality, and cultural resources.

Several additional resources that were appropriately analyzed and described in the 2012 Final EIS were not carried forward for detailed analysis in this SEIS because the proposed desert tortoise translocation activities would have negligible or no effects on such resources, as described below.

Recreation. Impacts to recreation are typically addressed as a component of Land Use, but were given focused attention in the organization of the 2012 Final EIS because of the proposed acquisition of land in the Johnson Valley OHV Area. In this SEIS, the proposed translocation of tortoises, installation of fencing, and post-translocation monitoring in and around specific recipient sites would not appreciably affect recreation except potentially in one site-specific instance under the No-Action Alternative. Accordingly, for purposes of this SEIS, potential impacts associated with recreational uses, including OHV activities, are discussed in Sections 3.2 and 4.2, *Land Use*, instead of a stand-alone Recreation section.

Socioeconomics and Environmental Justice. The proposed action to translocate desert tortoises would not involve or stimulate any direct or indirect changes in the number or composition of assigned personnel at the Combat Center or local/regional BLM offices; therefore, no changes in population, housing, public schools and healthcare facilities, emergency (e.g., fire and police) services, or the provision of potable water, wastewater treatment, power, and communications are anticipated. The proposed action would generate a short-term marginal increase in demand for construction crews and commercial helicopter flights during fence installation and translocation of the tortoises, respectively. This small, short-term increase in demand for such services would be beneficial to local businesses, but is not expected to stimulate long-term changes in overall employment or a change in local population or other socioeconomic metrics. Populations that are subject to environmental justice considerations (i.e., low-income and minority populations), as well as children and the elderly, are not located within or near the project area. Based on these considerations, socioeconomics and environmental justice are not discussed further in this SEIS.

Public Health and Safety. None of the proposed translocation areas have been nor would be used for military training, so there is no expectation that project workers could encounter unexploded ordnance during construction or inspection (MCAGCC 2016c).

As described in Section 2.2.2.3, *Translocation*, helicopters carrying tortoises for translocation would land within Main Supply Routes (MSRs) or other existing roads/routes and preferably within intersections of roads. Monitors would be located on the roads at safe distances on either side of the helicopter landing

area, to prevent OHVs or unauthorized Combat Center personnel from approaching the helicopter landing area during translocation operations. Helicopter use for translocation would be minimal and temporary, occurring over a 10- to 12-day period with an anticipated 40 to 50 total helicopter trips (4 trips per day). This would represent a small increase on BLM lands; however, given implementation of the Aviation Safety Management Plan, the impact to public safety would be less than significant. On Combat Center lands, the increase in air traffic would be negligible relative to the approximately 59,000 annual aircraft sorties conducted at the Combat Center. All flight safety and air traffic control requirements and procedures would be followed.

As described in Section 2.6, *Special Conservation Measures*, a project-specific Health and Safety Plan would be prepared for the proposed action. The Health and Safety Plan would prevent or minimize safety hazards to project workers and the general public during the fence construction phase. All utilities in the areas subject to construction of fences would be located during pre-project planning, and the fenceline would be routed to avoid intersecting underground utilities, if possible. If a fence must cross over an underground utility, t-posts would be installed on either side of the utility corridor to ensure that placement of t-posts would not contact underground utilities, and the fence would be laid on the ground surface and secured with rocks, as described in Chapter 2.6, *Special Conservation Measures*. Thus, no public health and safety impacts are anticipated with respect to underground utilities during the construction phase. The monitoring activities would not involve surface disturbance, so there would be no potential public health and safety issues related to underground utilities associated with monitoring.

Compliance with the BMPs described in Section 2.6, *Special Conservation Measures*, would prevent/minimize potential releases of and exposure to hazardous materials and wastes associated with the proposed project. Petroleum, oils, and lubricants would comprise the majority of hazardous materials associated with the alternatives; these would be consumed in use. Hazardous wastes (such as used engine oil) are expected to be minimal. Any hazardous materials and wastes associated with the project would be properly stored, labeled, handled, and disposed of according to all applicable federal, state, local, and Marine Corps regulations and requirements. Therefore, no impacts with respect to hazardous materials and wastes are expected.

Based on the considerations above, public health and safety is not discussed further in this SEIS.

Visual Resources. The desert tortoise exclusion fencing and signs that would be installed would be visually consistent with other rangeland-type fencing and signs already in place on BLM lands and designated wilderness areas. The fence design ensures that visibility of the fence would decline rapidly with increasing distance, and no communities or residences are located within visual range of the proposed fence locations. Visual resource impacts would be negligible and applicable only to small, isolated areas in the vicinity of each fence. Based on these considerations, this resource is not discussed in detail in this SEIS; however, because visual impacts are of particular concern relative to preserving and maintaining the unique characteristics of wilderness areas, indirect visual impacts to wilderness areas are considered in the discussion of wilderness areas in the Land Use sections of Chapters 3 and 4 of this SEIS.

Transportation and Circulation. The desert tortoise exclusion fencing would not cross or block any transportation routes and therefore would not impede transportation or circulation. There would be no changes to traffic on or off the Combat Center or BLM lands as a result of the proposed action. Use of commercial helicopters to transport some of the desert tortoises to specific recipient sites would temporarily halt traffic on designated roadways used as landing sites. However, traffic disruption would be minimal and temporary, occurring over a 10- to 12-day period with an anticipated 40 to 50 total

helicopter trips (4 trips per day), with landing sites located on unimproved roads that are not heavily travelled. Therefore, less than significant, temporary impacts to transportation and circulation are anticipated, and this resource was eliminated from further analysis.

Airspace Management. Under the proposed action, there would be no changes to airspace management or airspace operations. Commercial helicopter use for translocation would be minimal and temporary, occurring over a 10- to 12-day period with an anticipated 40 to 50 total trips (4 trips per day). This would be negligible compared to the approximately 59,000 annual aircraft sorties at the Combat Center. As described in Section 2.6, *Special Conservation Measures*, the Marine Corps would develop and BLM would need to approve an Aviation Safety Management Plan to address and resolve potential conflicts between helicopter flights for translocation and other airspace use. Therefore, airspace management was eliminated from further analysis.

Noise. Implementation of the proposed action would produce no changes in the number or types of military operations or OHV activities in the project area, which are the two most prominent contributors to noise in the area. Small and temporary increases in vehicle noise would occur during the installation of the tortoise fencing, as well as from vehicles used over time during tortoise monitoring. Use of commercial helicopters to transport some of the desert tortoises to specific recipient sites would also marginally and temporarily increase baseline noise levels along the routes of travel during the 10- to 12-day period in which helicopters would be used for translocation. However, no noise-sensitive receptors are present in the affected areas and individual point sources of noise from light trucks and helicopter flights would not be focused in any single area at the same time. The noise environment would return to baseline levels immediately following each vehicle or helicopter trip. In consideration of the above, the noise environment is not analyzed further in this SEIS.

Geological Resources. As described in Section 2.2.2.2, tortoise exclusion fences would be installed into trenches approximately 4 to 6 inches (10 to 15 cm) wide and 12 inches (30 cm) deep, for the length of each section of fence. It is anticipated that a 16 ft (5 m) wide area along the length of the fence would be used for a maintenance road and construction material laydown, resulting in surface disturbance (on Combat Center land only). Vehicles would use this new maintenance road to transport the fence materials to the site. The fenceline would cross washes in some places and would be reinforced in these areas to minimize erosion, or built to break away in floods to be followed by quick repair. Fencing would be inspected and repaired as described in Section 2.1.2.2.

As described in Section 2.6, *Special Conservation Measures*, all vehicular traffic associated with the tortoise translocation on BLM lands would be limited to routes that have been designated “open” (signed) by BLM. New access roads or cross-county vehicle travel would not be permitted, so there would be no additional ground surface disturbance associated with vehicles traveling to the translocation sites on BLM lands for fenceline construction or tortoise monitoring purposes.

In summary, excavation and surface disturbance associated with the proposed action would be minimal. The project includes measures to minimize erosion and prevent vehicle except on existing roads (except where new maintenance roads would be established along fencelines). No topographic features would be modified or otherwise altered. Therefore, negligible impacts to geological resources are anticipated, and this resource is not discussed further in the SEIS.

Water Resources. As described above under geological resources, the fenceline would be reinforced to minimize erosion where it crosses washes. Groundwater within the project area generally is found at depths of hundreds of feet below the ground surface, except at some playa lakes where it can be found a few feet below the surface (U.S. Geological Survey [USGS] 2003; Li and Martin 2008). However, the

proposed fencelines under the project alternatives would not cross playa lakes. Because trenches for the tortoise fencing would be excavated to a depth of only 12 inches (30 cm) below the surface, there would be no impact to groundwater. As described in Section 2.6, *Special Conservation Measures*, water would be applied to disturbed surfaces and helicopter landing sites to control fugitive dust emissions, but such applications would be minimal in quantity and scale and are not expected to impact local water supplies. Based on these considerations, and the short-term and temporary nature of project implementation, no impacts to water resources are anticipated and this resource is not discussed further in this SEIS.

Utilities and Infrastructure. None of the alternatives would result in changes to the numbers of personnel (military, civilian, or contractors) assigned to the Combat Center so there would be no change to utility use (e.g., potable water, wastewater, electricity, telephone, natural gas, etc.) at the Combat Center or in the surrounding communities. Installation of the desert tortoise exclusion fencing would involve minor surface excavations only. The fences would not affect roadways on the Combat Center, BLM lands, or wilderness areas. Transmission lines owned by Southern California Edison traverse the northwestern border of the WEA and Sunshine Peak and Lavic Lake Training Areas. Major natural gas pipelines traverse areas north of the Combat Center, coming into San Bernardino County from Nevada, south of Interstate-40. As part of the project-specific Health and Safety Plan (see Section 2.6, *Special Conservation Measures*), the NREA and its contractors would be required to contact the MCAGCC Public Works Officer to locate all on-base underground utilities within the proposed fence alignment, and Underground Service Alert of Southern California (DigAlert) for the locations of all long-distance, commercial underground utility corridors while the project is in the design stage. The fenceline would be routed to avoid intersecting underground utilities in the project areas and not excavate over them if it cannot be re-routed around them. Therefore, negligible impacts to utilities and infrastructure are anticipated, and this resource is not considered further in this SEIS.

The following subsections provide a definition of the four resources that are analyzed further in this SEIS, and describe the existing conditions within the affected environment for each resource.

3.1 BIOLOGICAL RESOURCES

3.1.1 Definition of Resource

Biological resources include plant and animal species and the habitats in which they occur. Biological resources are important because they (1) influence ecosystem functions and values, (2) have intrinsic value and contribute to the human environment, and (3) are the subject of a variety of statutory and regulatory requirements. The analysis presented in the 2012 Final EIS considered the biological resources that were subject to impacts from the proposed land acquisition and MEB-level training exercises. Several biological sub-resources that were appropriately analyzed and described in the 2012 Final EIS are not carried forward for detailed analysis in this SEIS because the proposed desert tortoise translocation activities would have negligible or no effects on such sub-resources, as described below in Section 3.1.3, *Scope of Analysis*.

For purposes of this SEIS, the biological resources considered are divided into three main categories:

- *Vegetation* includes terrestrial plant communities and their component species, as well as non-native vegetation, landscaped, and disturbed areas. Special status plant species are discussed in more detail in a separate section (see below).
- *Wildlife* includes the characteristic animal species that occur in the project area. Special consideration is given to bird species protected under the federal Migratory Bird Treaty Act

(MBTA) and Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Protected species and special status animal species are discussed in more detail in separate sections (see below).

- Protected and special status species are described as follows:
 - *Protected species* are those species afforded protection under the federal ESA of 1973. The only resident species discussed in this SEIS with this protected status is the desert tortoise (*Gopherus agassizii*).
 - *Special status species* include plant and animal species that occupy limited or unique habitats and those species that various state and federal agencies are interested in tracking. These taxa often require specific survey methods, monitoring, and/or management consideration. The following are criteria for species to be considered in this SEIS:
 - Species that are proposed for listing, or are candidates for listing under the federal ESA (USFWS 2016c, d).
 - Plant species listed as rare, threatened, or endangered in California by the California Native Plant Society (CNPS) (CNPS 2016).
 - Species that are listed, proposed for listing, or are candidates for listing under the California ESA (CDFW 2016).
 - Species listed by the BLM as Sensitive (BLM 2015a, 2010).
 - Species listed by the CDFW as California Species of Special Concern or Fully Protected (CDFW 2016).
 - Bird species listed by the USFWS as Birds of Conservation Concern (USFWS 2008).

3.1.2 Regulatory Framework

3.1.2.1 Federal Statutes and Regulations

The primary federal statutes and regulations that pertain to biological resources are the ESA and the MBTA. These and other relevant federal statutes and regulations (i.e., NEPA, the Bald and Golden Eagle Protection Act, and the Noxious Weed Act/EO 13112) are described in the 2012 Final EIS (see Final EIS Section 3.10.2, *Regulatory Framework*).

3.1.3 Scope of Analysis

Certain sub-resources that were appropriately analyzed and described in the 2012 Final EIS were considered but not carried forward for further analysis in the Biological Resources sections of this SEIS. The purpose of this section is to explain the rationale for dismissing specific biological sub-resources from further analysis, and thereby define the scope of the biological resources analysis to be commensurate with the anticipated level of impact.

3.1.3.1 Overview of Relevant Project Elements and Construction Footprint

This subsection summarizes the relevant project elements and construction footprint that were considered in the evaluation of the biological resources scope of analysis. Under all alternatives, tortoise exclusion fences would be installed into trenches approximately 4 to 6 inches (10 to 15 cm) wide and 12 inches (30 cm) deep, for the length of each section of fenceline (see Section 2.2.2.2). Biological resource SCMs include a requirement that regular fence inspections would include

monitoring and removal of any soil and plant debris that might collect at the fence. Vehicles used to carry the fence materials to the site would disturb a small width of surface soil around the length of the trench. It is anticipated that a 16 ft (5 m) wide area along the length of the fence would be used for a maintenance road and construction material laydown, resulting in surface disturbance (on Combat Center land only). The fenceline would cross washes in some places, and would be reinforced in these areas to minimize erosion, or built to break away in floods to be followed by quick repair (MCAGCC 2016c). As described in Sections 2.1 and 2.2, all permanent exclusion fencing would be inspected monthly and immediately after all rainfall events where soil and water flows through washes or overland and could damage the fence or erode the soil underneath. Temporary fencing would be inspected at least weekly if activities are occurring in the vicinity that could damage the fence. Any damage to installed tortoise fencing, either permanent or temporary, would be repaired immediately.

Helicopters used to translocate tortoises would land only on MSRs or other existing roads/routes and within intersections of roads. Water trucks would be used to keep landing sites damp enough to minimize the generation of fugitive dust. As such, ground disturbance from helicopter landings would be minimal.

As described in Section 2.6, *Special Conservation Measures*, all vehicular traffic associated with the tortoise translocation on BLM lands would be limited to routes that have been designated “open” (signed) by BLM. On BLM land, no new access roads or cross-county vehicle travel would be permitted, so there would be no additional ground surface disturbance associated with vehicle transit therein.

Furthermore, implementation of SCMs as described in this SEIS (Section 2.6) would minimize the potential for impacts to biological resources from the proposed action.

3.1.3.2 Vegetation

The primary impacts to vegetation would be from fence construction. As discussed above, tortoise exclusion fences would be installed into trenches for the length of each section of fenceline. The precise alignment would be established on-site in the presence of an Authorized Biologist with slight variations in placement (excavation and surface disturbance), as warranted to avoid damage to long-lived woody or succulent plants while making it easier to excavate the trench. Section 3.1.4.2 describes the existing vegetation and Sections 4.1.2.1, 4.1.3.1, and 4.1.4.1 analyze the impacts to vegetation from fence and associated maintenance road construction under the proposed alternatives. A minor increase in consumption of vegetation by translocated tortoises would occur; however, desert tortoises currently exist in these areas and historically occurred in greater numbers, so additional consumption would be negligible.

3.1.3.3 Wildlife

Numerous vertebrate and invertebrate species have been recorded or have the potential to occur in the vicinity of the proposed project areas as described in the 2012 Final EIS. Wildlife species at the Combat Center are typical of Mojave Desert fauna with the exception of a wide variety of species only found to occur at the golf course or sewage ponds at Mainside, including the California toad (*Anaxyrus boreas halophilus*), desert cottontail (*Sylvilagus audubonii*), common raccoon (*Procyon lotor*), and 126 species of primarily migrant birds (Cutler et al. 1999). Of the 256 vertebrate species observed within the Combat Center by Cutler et al. (1999), about half were only observed at Mainside. However, no activities associated with the proposed action would occur at Mainside and, therefore, these species would not be directly affected by the proposed action. LaRue (2013) surveyed 21 of 22 RTAs, but did not survey Mainside, and found 92 species of reptiles, birds, and mammals; no fish or amphibians were observed.

Steppek et al. (2013) also performed wildlife-specific surveys on the Combat Center for reptiles and mammals. Although surveys for general wildlife have not been performed at recipient sites on BLM lands, wildlife is anticipated to be similar to that found on the Combat Center.

Under the proposed action, tortoise fencing would be installed in accordance with the tortoise translocation plans. Tortoise exclusion fencing would be 18 inches (45 cm) above ground and the total maximum height with three-strand wire (placed directly above the exclusion fencing) would be approximately 4 ft (1.3 m). While the precise area of impact would vary by alternative, only a small portion (less than one half of 1%) of each habitat type within the proposed recipient and control sites would be impacted, and all impacts would be located on the Combat Center. An Authorized Biologist would be present during all fence installation activities to ensure that placement of the fence would adaptively avoid protected and special status biological resources (e.g., flora and fauna species) and long-lived woody vegetation (see Section 2.6). Additionally, fencing would only be placed on a relatively small portion of the north, northwest, and southeast borders of the Combat Center and would not preclude species from moving across the majority of the Combat Center boundary.

The control of human-subsidized predators (particularly ravens and coyotes) under Alternatives 1 and 2 would benefit prey species (particularly small mammals and reptiles) as well as non-subsidized predators that prey upon these species.

Noise would occur as a result of the transport of desert tortoises by helicopter, occurring over a 10- to 12-day period with an anticipated 40 to 50 total helicopter trips (4 trips per day). While these trips would represent a small increase on BLM lands, impacts associated with noise would be less than significant. On Combat Center lands, the increase in air traffic would be negligible relative to the approximately 59,000 annual aircraft sorties conducted at the Combat Center. In addition, minimal temporary noise from minor vehicle use would occur during the installation of the tortoise fencing.

Invertebrates

Invertebrates (especially insects) are an important component of desert ecosystems, providing food for numerous vertebrate species (e.g., birds, reptiles, amphibians, and bats) and acting as pollinators for plant species. Studies published in 2005 and 2006 identified more than 1,600 terrestrial invertebrate species on the Combat Center and six aquatic invertebrate species in all nine dry lakes; none of the species detected are special status or considered rare or sensitive (Pratt 2005; Simovich 2006).

A cumulative amount of habitat ranging from approximately 40 miles (65 km) to 50 miles (79 km) long by 19 ft (6 m) wide (depending on the Alternative selected) would be eliminated for the fence and maintenance roads combined. Minimal additional habitat disturbance would occur under the proposed action, and the extent of disturbance or mortality to terrestrial invertebrate populations would be small in scale and temporary as invertebrates would rapidly return/recolonize from adjacent areas. No impacts would occur to surface waters from implementation of the proposed action. Therefore, potential impacts to terrestrial and aquatic invertebrates as a result of the proposed action would be negligible, and impacts to invertebrates will not be analyzed further in this SEIS.

Fish

Perennial springs and fish-bearing waters would be avoided. As such, the proposed action would have no impact on fish. Therefore, impacts to fish will not be analyzed further in this SEIS.

Amphibians

Two amphibian species, the California toad and the red-spotted toad (*Anaxyrus punctatus*) were identified on the Combat Center during past wildlife inventories by Fromer and Doderer (1982) and Cutler et al. (1999). Both species were only observed outside the proposed project areas, near Mainside, and at water holes in the American Mine Training Area, respectively. Red-spotted toad may occur in additional rare, isolated, and ephemeral water sources known as “tinajas” (rock basins that temporarily hold water from rainfall or streamflow) in the project areas, but there are no records at these sites (Cutler et al. 1999). No other amphibian species are known to occur, nor have any been observed during additional surveys (Karl 2009; Stepek et al. 2011; LaRue 2013).

A cumulative amount of habitat ranging from approximately 40 miles (65 km) to 50 miles (79 km) long by 19 ft (6 m) wide (depending on the Alternative selected) would be eliminated for the fence and maintenance roads combined. Minimal additional habitat disturbance would occur under the proposed action; no impacts to surface waters are anticipated, and project-related noise would be very localized and temporary. As described in Section 2.6.2, *Special Conservation Measures*, bird perch deterrents would be implemented on all sign posts that would be installed under the proposed action, minimizing the risk of increased avian predation on amphibians from the creation of additional perching locations. Therefore, potential impacts to amphibians as a result of the proposed action would be negligible, and impacts to amphibian species will not be analyzed further in this SEIS.

Reptiles

The reptile diversity observed on the Combat Center represents a typical community structure for lower elevation Mojave desert scrub habitats. Habitat diversity and, as a consequence, reptile species diversity are somewhat limited by the lack of high elevations and the absence of natural water sources. During numerous studies conducted on the Combat Center, a total of 28 species of reptile have been observed (15 lizards, 12 snakes, and 1 tortoise) (Fromer and Doderer 1982; Cutler et al. 2009; Stepek et al. 2013; LaRue 2013). Additionally, there are nine reptile species that may be found on the Combat Center but have not been documented (MCAGCC 2012). Section 3.10.3 of the 2012 Final EIS provides more information regarding the specific reptiles observed and Appendix I to the Final EIS contains the complete list of reptile species known to occur on the Combat Center.

A cumulative amount of habitat ranging from approximately 40 miles (65 km) to 50 miles (79 km) long by 19 ft (6 m) wide (depending on the Alternative selected) would be eliminated for the fence and maintenance roads combined. Minimal additional habitat disturbance would occur under the proposed action, no impacts to surface waters are anticipated, and impacts from noise would be minimal. The fencing may impede larger reptiles such as the northern desert iguana (*Dipsosaurus dorsalis dorsalis*) and snake species because they would likely be too large to fit through the fencing (1-inch [2.5-cm] horizontal by 2-inch [5-cm] vertical, galvanized welded wire mesh) and would not be able to climb over the fence (24 inches [60 cm] above ground for tortoise exclusion, 4 ft [1.3 m] total above ground height with three-strand). However, impacts would be negligible due to the relatively limited extent of fencing around the Combat Center boundary, and transiting reptiles would be able to enter and exit the Combat Center through a multitude of alternate locations as needed. As described in Section 2.6.2, *Special Conservation Measures*, bird perch deterrents would be implemented on all sign posts that would be installed under the proposed action, minimizing the risk of increased avian predation on reptiles from the creation of additional perching locations. Therefore, with the exception of the desert tortoise, potential impacts to reptiles as a result of the proposed action would be negligible, and impacts to other reptile species will not

be analyzed further in this SEIS. Potential impacts to desert tortoise are analyzed in detail in Section 4.1, *Biological Resources*.

Birds

According to two studies, there are 211 bird species confirmed on the Combat Center (Cutler et al. 1999; LaRue 2013). The most commonly observed resident birds include various species of sparrows, finches, quails, and doves (BLM 2005). Bird species inventories at the Combat Center have been conducted in the early 1980s (Fromer and Edwards 1982), late 1990s (Cutler et al. 1999), and as recent as 2011 (LaRue 2013). Cutler et al. (1999) recorded 87 resident bird species at the Combat Center and another 122 migrant, vagrant, or other transient bird species (a complete list of birds known to occur on the Combat Center is included as Appendix I to the 2012 Final EIS). LaRue (2013) encountered 58 species through visual or audio detection in surveys. The MAGTF Training Command MCAGCC Natural Resources Management Plan (University of California, Riverside 1993) and the MAGTF Training Command MCAGCC Bird Inventory (Fromer and Edwards 1982) found a total of 135 to 140 species of birds present at the Combat Center. In contrast to the low diversity of resident bird species, many migrant bird species utilize the Mojave Desert and specifically the Combat Center, likely due to the permanent water sources at Mainside – which are outside the proposed tortoise translocation areas. As such, besides potential seasonal occurrence at ephemeral water sources (no records describing such usage have been found), many of the migrant bird species that rely on permanent water sources at Mainside are not expected to occur elsewhere on the Combat Center, as is supported in the 2011 surveys (LaRue 2013).

A cumulative amount of habitat ranging from approximately 40 miles (65 km) to 50 miles (79 km) long by 19 ft (6 m) wide (depending on the Alternative selected) would be eliminated for the fence and maintenance roads combined. Minimal additional habitat disturbance would occur under the proposed action, no impacts to surface waters are anticipated, and impacts from noise would be minimal. Bird species may temporarily avoid translocation activities but would be expected to return within a short time. In addition, tortoise fencing that would be installed during translocation activities would not impede the movement of any bird species. Therefore, potential impacts to birds as a result of the proposed action would be negligible, and impacts to other bird species will not be analyzed further in this SEIS.

Mammals

According to several studies, there are 41 mammal species confirmed on the Combat Center, and an additional 16 mammals that could potentially occur (University of California, Riverside 1993; Brown and Berry 1998; Cutler et al. 1999; LaRue 2013; Stepek et al. 2013). The most common large mammal is the coyote (*Canis latrans*), while common medium-sized mammals include the black-tailed jackrabbit (*Lepus californicus*) and desert cottontail. Common small mammals include nocturnally active kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), and deer mice (*Peromyscus* spp.). More information about the specific species observed as well as a complete list of mammals observed within the project area can be found in Section 3.10.3 and Appendix I of the 2012 Final EIS.

A cumulative amount of habitat ranging from approximately 40 miles (65 km) to 50 miles (79 km) long by 19 ft (6 m) wide (depending on the Alternative selected) would be eliminated for the fence and maintenance roads combined. Minimal additional habitat disturbance would occur under the proposed action, no impacts to surface waters from the proposed action are anticipated, and impacts from noise would be minimal. Mammal species would readily flee the tortoise translocation areas as necessary to avoid translocation activities. The adaptive placement of fencing, with an Authorized Biologist present to avoid protected and special status resources (see Section 2.6, *Special Conservation Measures*), would not

actively avoid kangaroo rat burrows. However, due to the relatively limited area of fencing required under the proposed action, the minimal impacts to habitat, and the prevalence of this species across the Combat Center, population-level or measurable effects would not be expected to occur and potential impacts to kangaroo rat species would be negligible. Due to the limited height of the tortoise fencing, it would not impede the movement of most mammal species. Fencing only has the potential to impede mammals that are too large to fit through the fence, but too small to jump or climb over. However, impacts would be negligible due to the relatively limited extent of fencing around the Combat Center boundary; transiting mammals would be able to enter and exit the Combat Center through a multitude of alternate locations as necessary. As described in Section 2.6, *Special Conservation Measures*, bird perch deterrents would be implemented on all sign posts that would be installed under the proposed action, minimizing the risk of increased avian predation on small mammals from the creation of additional perching locations. Therefore, potential impacts to mammals as a result of the proposed action would be negligible, and impacts to mammal species will not be further analyzed in this SEIS.

3.1.3.4 Species Protected by the Migratory Bird Treaty Act

Numerous MBTA-protected bird species have been recorded or have the potential to occur within the proposed project areas and are described in detail in the 2012 Final EIS. However, impacts to all other MBTA-protected bird species from the proposed action would be negligible. Minimal habitat disturbance would occur under the proposed action, no impacts to surface waters from the proposed action are anticipated, and impacts from noise would be minimal. In addition, the tortoise fencing would not impede the movement of any of the MBTA-protected bird species. Therefore, negligible impacts to MBTA-protected bird species are anticipated, and these species are not analyzed further in this SEIS.

3.1.3.5 Special Status Species

Numerous special status species have been recorded or have the potential to occur within the proposed project areas and are described in detail in the 2012 Final EIS. However, impacts to all of these special status species (with the exception of the desert tortoise) from the proposed alternatives would be negligible. A cumulative amount of habitat ranging from approximately 40 miles (65 km) to 50 miles (79 km) long by 19 ft (6 m) wide (depending on the Alternative selected) would be eliminated for the fence and maintenance roads combined. Minimal additional habitat disturbance would occur under the proposed action, no impacts to surface waters from the proposed action are anticipated, and impacts from noise would be minimal. Due to the limited height of the tortoise fencing, it would not impede the movement of special status species (with the exception of desert tortoises, which is the intention), including bighorn sheep (*Ovis canadensis*). The fencing only has the potential to impede specific species that are too large to fit through the fence, but too small to jump or climb over. However, population-level impacts would be negligible due to the relatively limited extent of fencing around the Combat Center boundary; transiting species would be able to enter and exit the Combat Center through a multitude of alternate locations. Furthermore, fences would not be constructed in mountainous areas that are more likely to be used by bighorn sheep. In addition, special status plant species would be avoided during the installation of the fencing. As stated in Section 2.6, *Special Conservation Measures*, the Marine Corps would provide an Authorized Biologist to be present for all sign and post emplacement and for all trenching for desert tortoise exclusion fencing and the permanent maintenance road. The monitor would ensure that no signs, posts, trenches, or roads would be placed in a manner that would disturb any special status species. Therefore, negligible impacts to all of the special status species (with the exception of the desert tortoise) are anticipated, and these other species are not analyzed further in this SEIS. Potential impacts to desert tortoises are analyzed in detail in Section 4.1, *Biological Resources*.

3.1.4 Existing Conditions

3.1.4.1 Overview

Section 3.10.3.1, *Overview* of the 2012 Final EIS described (1) the general characteristics of the south central Mojave, (2) natural resource management plans in the west Mojave, and (3) surveys and mapping that have been performed in the project area. Relevant updates since publication of the 2012 Final EIS include the following, each of which is described in further detail below:

- The Draft Supplemental EIS for the West Mojave Route Network Project (WMRNP) and Plan Amendment was published in February 2015 (BLM 2015b);
- Phase I of the Desert Renewable Energy Conservation Plan (DRECP) Proposed Land Use Plan Amendment and Final EIS (BLM 2015c) and the ROD (BLM 2016b) was published in October 2015 and September 2016, respectively; and
- Four years of additional surveys of the translocation donor, recipient, and control sites, as well as consultation with the USFWS, have been performed.

Draft Supplemental EIS for the West Mojave Route Network Project and Plan Amendment

In February 2015, the BLM published the Draft Supplemental EIS for the WMRNP and Plan Amendment (BLM 2015b). The WMRNP is a travel management planning effort covering 9.24 million acres (3.74 million ha) in the West Mojave area of the California desert that supplements the 2006 West Mojave Plan (BLM 2006). The supplemental plan has two general sets of goals that include (1) Access Management (i.e., identification of an overall travel and transportation management strategy, implementation framework, and access network for public land users in the West Mojave); and (2) Livestock Grazing (i.e., additional livestock grazing alternatives that may enhance long-term conservation goals identified in the 2006 West Mojave Plan). The public comment period for the Draft EIS closed in January of 2016 (BLM 2016a); the Final EIS and ROD are pending.

Desert Renewable Energy Conservation Plan Proposed Land Use Plan Amendment and EIS

The DRECP is a landscape-scale planning effort designed to provide for additional protection and conservation of desert ecosystems in conjunction with development of solar, wind and geothermal energy projects. The DRECP covers 22.5 million acres (9.1 million ha) in seven California counties (Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego) (BLM 2015c). The plan is being prepared in two phases by the Renewable Energy Action Team, composed of the BLM, USFWS, California Energy Commission, and the CDFW:

- Phase I of the DRECP addressed the BLM component of the Plan that designated development focus areas, conservation areas, and recreation areas on public lands. Phase I placed particular emphasis on designating areas for renewable energy development and completed a BLM Land Use Plan Amendment for the DRECP area. The Land Use Plan Amendment also eliminated the Multiple Use Classes in the California Desert Conservation Area (CDCA) Plan and replaced them with specific land designations (BLM 2016b). The BLM released the Final EIS for the Land Use Plan Amendment in November of 2015 (BLM 2015c) and the public comment period ended on May 9, 2016; the related ROD was signed September 14, 2016 (BLM 2016b).
- Phase II of the DRECP is pending, will address issues and concerns related to non-BLM components of the DRECP, and will focus on aligning local, state, and federal renewable energy development and conservation plans, policies and goals.

Additional Surveys and USFWS Consultation

The 2012 Land Acquisition BO required that 3 years of baseline data be collected before translocation. As a result, from 2012 to 2015, field surveys were conducted to examine translocation-associated factors in both the impact areas and the recipient and control sites (Appendix A). The factors that were examined during the surveys include the following:

1. Tortoise Density – mark-recapture and Tortoise Regional Estimate of Density surveys were conducted within the WEA, SEA, and recipient and control study areas (MCAGCC 2016c).
2. Habitat Analysis – qualitative and quantitative transects were conducted within the WEA, SEA, and recipient and control study areas.
3. Baseline Disease Status and Behavior – health assessments were conducted and transmitters were placed on tortoises in the WEA, SEA, and recipient and control study areas.
4. Predation – raven abundance and nest surveys were conducted in the recipient and control study areas, and dog/coyote-related trauma analysis of tortoises was performed at recipient areas and control sites.
5. Genetic Analysis – assessment of genetic differentiation among impact and recipient and control study areas was conducted.

In addition, tortoise clearance surveys were conducted on most of the 79 square miles (205 km²) comprising the WEA and SEA high and medium impact areas from September 2014 through October 2015. All tortoises of adequate size were transmitted, while juvenile tortoises too small to affix transmitters were moved to new holding pens at NREAs TRACRS. *In situ* monitoring of all tortoises with transmitters was accomplished by monthly tracking, following an initial 2-week period of intensive tracking after transmitter attachment. Health assessments were conducted on all tortoises per current USFWS guidelines (USFWS 2015).

3.1.4.2 Vegetation

The project action area lies within the South-Central Floristic Region of the Mojave Desert (Rowlands et al. 1993). While flora are still fairly typical of the Mojave Desert, temperature and rainfall patterns approach conditions exemplified by the hotter, drier Sonoran Desert to the south (MCAGCC 2012), which experiences summer and winter rain. Vegetation largely determines the type and distribution of animals that can be supported.

Plant Communities

The primary vegetation type within the action area is desert scrub, which can be subdivided into the shrub-dominated plant communities that occur on the study areas (Tables 3.1-1 and 3.1-2). Tables 3.1-1 and 3.1-2 also include acreages and the plant communities that are dominated by trees rather than shrubs, and land classifications that are not defined by dominant vegetation. The following descriptions describe the action area considered for this SEIS. For additional discussion of vegetation refer to the 2012 Final EIS (DON 2012).

Table 3.1-1. Plant Communities and Land Classifications in Recipient Areas (No-Action Alternative)

Area	Land Cover/ Vegetation Type Active and Stabilized Dune	Land Cover/ Vegetation Type Badlands, Rock Outcrops, and Cliffs	Land Cover/ Vegetation Type Desert Playa	Land Cover/ Vegetation Type Desert Scrub	Land Cover/ Vegetation Type Desert Wash	Land Cover/ Vegetation Type Developed	Land Cover/ Vegetation Type Riparian Woodland and Shrubland	TOTAL
Recipient Areas								
Ord-Rodman	0.6	8,520	-	14,540.1	288	68.1	58.2	23,475
Sunshine Peak	-	1,467.8	-	2,180.3	58.9	-	-	3,707
SEA	-	80.6	-	2,854.2	0.1	-	-	2,934.9
WEA	0.8	6,984.9	1.7	5,026.8	-	-	1.1	12,015.3
Alternate Recipient Areas								
Bullion	9.5	816	4.1	1,323.9	234.9	-	28.6	2,417
Emerson Lake	296.8	71	-	2,031.6	17.6	-	-	2,417
TOTAL	307.7	17,940.3	5.8	27,956.9	599.5	68.1	87.9	46,966

Note: Numbers shown are provided in acres.

Source: USGS 2010.

**Table 3.1-2. Plant Communities and Land Classifications in Recipient and Control Sites
(Alternative 1 and Alternative 2)**

Site	Land Cover/ Vegetation Type Active and Stabilized Dune	Land Cover/ Vegetation Type Badlands, Rock Outcrops, and Cliffs	Land Cover/ Vegetation Type Desert Playa	Land Cover/ Vegetation Type Desert Scrub	Land Cover/ Vegetation Type Desert Wash	Land Cover/ Vegetation Type Developed	Land Cover/ Vegetation Type Riparian Woodland and Shrubland	TOTAL
Recipient Sites								
Lucerne-Ord	-	11,514.5	19.2	25,904.9	0.7	72.8	106.5	37,618.6
Rodman- Sunshine Peak North	1.7	5,254.5	3.4	19,860.9	944.3	-	12.7	26,077.5
Siberia	27.1	3,587.1	22.3	17,151.4	821.7	-	2.4	21,612
Broadwell	-	633.3	-	9,451.0	20.8	-	16.0	10,121.1
Cleghorn	-	54.9	-	2,265.7	0.1	-	-	2,320.7
Bullion (Alt. 1)	17.7	5,967.2	1.4	6,345.5	691.4	-	49.5	13,072.7
Control Sites								
Rodman- Sunshine Peak South	-	3719.0	-	9,843.3	0.2	-	-	13,562.5
Daggett	-	1,223.9	-	4,910.3	7.0	42.3	-	6,183.5
Ludlow	0.2	781.1	0.4	2,260.7	11.8	-	-	3,054.2
Calico	-	815.6	-	1,172.6	5.6	-	-	1,993.8
Cleghorn Control	-	178.4	0.4	1,376.8	408.8	-	-	1,964.4
Bullion Control (Alt. 1)	101.4	373.0	-	1,377.4	158.5	-	-	2,010.3
Bullion Control (Alt. 2)	5.4	197.7	-	1,610.2	292.0	-	30.5	2,135.8
TOTAL (Alt. 1)	148.1	34,102.5	47.1	101,920.5	3,070.9	115.1	187.1	139,591.3 (Alt. 1)
TOTAL (Alt. 2)	34.4	27,960	45.7	95,807.8	2513	115.1	168.1	126,644.1 (Alt. 2)

Note: Numbers shown are provided in acres.

Source: USGS 2010.

Gap Analysis Program (GAP) land cover data (USGS 2010) were used to classify vegetation and other land cover types in the project areas. The GAP vegetation map is derived from remotely sensed data and field observations. The GAP maps land cover at the habitat or plant community level and defines mapping units based on location, landform, dominant community structure, life form (e.g., shrub or tree), and the most common suites of species. For the purpose of this analysis, GAP data were modified by grouping similar vegetation and/or habitat types into general categories and are discussed below. These descriptions represent all vegetation community classifications across the recipient and control sites under the proposed action. Acreages of all plant communities and habitats for the No-Action Alternative and Alternatives 1 and 2 in the recipient and control areas and sites are provided in Tables 3.1-1 and 3.1-2, respectively.

Desert Active and Stabilized Dune is composed of unvegetated to sparsely vegetated dunes and sand sheets. Common plants include white bursage (*Ambrosia dumosa*), fourwing saltbush (*Atriplex canescens*), creosote bush (*Larrea tridentata*), and big galleta (*Hilaria rigida*).

Badland, Rock Outcrop, and Cliff includes barren and sparsely vegetated landscapes (generally <10% plant cover) of steep cliff faces, narrow canyons, and smaller rock outcrops of various igneous, sedimentary, and metamorphic bedrock types. This also includes badland areas consisting of rounded hills that are formed in shale bedrock, often high in clay that expands with moisture and contracts with drying, also known as shrink/swell clay.

Desert Playa is a term for depressions that are intermittently flooded and subsequently evaporate, leaving behind a residue of salts. There is often an impermeable subsoil layer that keeps water near the soil surface. Bare ground and salt crusts are abundant on the soil surface. Typical plants include iodine bush (*Allenrolfea occidentalis*), bush seepweed (*Suaeda nigra*), or saltbush (*Atriplex* spp.).

Desert Scrub includes a suite of desert shrub-dominated communities, the most common being Mojave creosote bush scrub. This is a widespread, open-canopy habitat that occurs in broad valleys, lower bajadas, plains, and low hills in the Mojave and lower Sonoran Deserts. This sparse to moderately dense shrubland is dominated by creosote bush and white bursage, but many different species may be present. Other common plants include desert-holly, brittlebush (*Encelia farinosa*), ephedra (*Ephedra* spp.), ocotillo (*Fouquieria splendens* ssp. *splendens*), fourwing saltbush, allscale (*Atriplex polycarpa*), or other saltbushes.

Desert Wash habitats are intermittently flooded washes or arroyos that often dissect alluvial fans, mesas, plains, and basin floors. Although often dry, ephemeral stream processes, such as rapid sheet and gully flow, define this habitat. Desert wash plants may be sparse and patchy to moderately dense, typically occurring along the banks, but occasionally within the channel. Plants are quite variable but are mostly shrubs and small trees such as catclaw (*Senegalia greggii*), desert willow, desert almond (*Prunus fasciculata*), and mesquite (*Prosopis glandulosa* var. *torreyana*).

Developed areas include areas that do not support native vegetation and are characterized by permanent or semi-permanent structures. Examples include buildings, parking lots, pavement, concrete, freeways, maintained dirt roads, and railways.

Riparian Woodland and Shrubland occurs along lower elevation rivers and streams in desert valleys and canyons. Common trees include Fremont's cottonwood (*Populus fremontii* ssp. *fremontii*) and black willow (*Salix gooddingii*). Common species in riparian shrublands include sandbar willow (*Salix exigua*) and desert willow (*Chilopsis linearis*).

Non-Native Vegetation

Non-native plants are of concern in the west Mojave because they can often replace plants with higher value to wildlife, reducing the availability of suitable forage or habitat. The rate of wildfire spread and severity of fire effects on native shrubs can be increased by the structure and growth pattern of some non-native plants (Brooks 1999).

A survey of non-native vegetation in the eastern 6.25 miles (10 km) of the west study area and the western 3 miles (5 km) of the Combat Center revealed that the most widespread non-native annual plants include storksbill (*Erodium cicutarium*), split grass (*Schismus barbatus*, *S. arabicus*), red brome (*Bromus madritensis* ssp. *rubens*), cheat grass (*Bromus tectorum*), biennial mustard (*Hirschfeldia incana*), and tumbleweed (*Salsola tragus*) (AgriChemical & Supply 2005).

Other non-native plants have become locally common on the Combat Center as a result of supplemental irrigation, such as burgrass (*Cenchrus tribuloides*), crabgrass (*Digitaria* spp.), lambsquarter (*Chenopodium album*), plantain (*Plantago lanceolata*), tansy mustard (*Descurainia pinnata*), tumble mustard (*Sisymbrium altissimum*), puncture vine (*Tribulus terrestris*), and saltcedar (*Tamarix ramosissima*) (AgriChemical & Supply 2005). However, these species rarely spread beyond the confines of irrigated landscapes and are not commonly encountered throughout much of the affected area.

Sahara mustard (*Brassica tournefortii*) is an invasive plant that has become established along many roadsides and utility corridors in the Mojave Desert (AgriChemical & Supply 2005). Sahara mustard is a highly successful invader and may pose a considerable threat to native annuals because of its early seedling emergence and ability to germinate in moderately saline soils at a wide range of temperatures (Bangle et al. 2008).

Split grass is pervasive across the Combat Center (AgriChemical & Supply 2005), and its pervasiveness makes management strategies very difficult. At present, Sahara mustard and tumbleweed are removed by hand from the TRACRS. No information is available for the abundance of non-native species in the proposed recipient and control areas and sites.

3.1.4.3 Protected and Special Status Species

Protected - Federally Threatened or Endangered Species

Desert Tortoise

The desert tortoise is the only resident species discussed in this SEIS that is protected under the federal ESA. The following discussion provides a brief summary of the information provided in the 2012 Final EIS as well as relevant updates since the 2012 Final EIS was published; additional details on desert tortoise ecology and distribution can be found in the 2012 Final EIS. The results of previous translocation efforts at the Combat Center and elsewhere are discussed in Section 4.1.1.3, *Previous Translocation Efforts and Related Research*.

Background: The desert tortoise was listed as threatened by the State of California in 1989, and the Mojave Desert population (all tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California), now known as Agassiz's desert tortoise, was federally listed as threatened by the USFWS in 1990. The decline in desert tortoise numbers is discussed in more detail below.

The Combat Center is within the southern Mojave subdivision of the Western Recovery Unit for the desert tortoise. Because the Combat Center manages desert tortoise under its INRMP, the USFWS did not designate Critical Habitat on the installation. However, it shares a 6.2 mile (9.9 km) boundary with

the Ord-Rodman Critical Habitat area to the northwest, and the Pinto Mountain critical habitat area, which is 6.25 miles (10 km) southeast of the installation (MCAGCC 2012).

Typical habitat for the desert tortoise in the Mojave Desert has been characterized as creosote bush scrub in which precipitation ranges from 2 to 8 inches (5 to 20 cm), where a diversity of perennial plants is relatively high, and production of ephemerals is high (Luckenbach 1982; Turner 1982; Turner and Brown 1982; Germano et al. 1994; Berry et al. 2014; Mack et al. 2015). On the Combat Center, desert tortoises occur predominantly in creosote scrub habitat at elevations below 4,300 ft (1,311 m) above mean sea level.

The size of tortoise home ranges varies with respect to location, year, and sex (Berry 1986; O'Connor et al. 1994; Duda et al. 1999; Freilich et al. 2000; Franks et al. 2011). Home range size can also serve as an indicator of resource availability, opportunity for reproduction, and social interactions (BLM 2007). Females have long-term home ranges that are approximately half that of the average male, whose home range varies from 25 to 200 acres (10 to 80 ha) (Berry 1986). Over its lifetime, each tortoise may use more than 1,000 acres (400 ha) of habitat and may make periodic forays of more than 7 miles (11 km) at a time (Berry 1986). A study by Harless et al. (2009) found that female tortoise home ranges did not overlap with each other, but that they did overlap with male tortoises and that male tortoises home ranges overlapped and shared burrows with a similar number of tortoises of either sex. The authors concluded that the results suggested a lack of territoriality among tortoises. In a separate study, O'Connor et al. (1994) also concluded that their study provided no support for any territoriality or exclusivity of home ranges between individuals.

Refer to Tables 3.1-3 and 3.1-4 for a description of the general characteristics of each translocation area/site under the No-Action Alternative and Alternatives 1 and 2, respectively.

Description of the Proposed Control and Recipient Areas/Sites: Tables 3.1-3 and 3.1-4 provide summarized descriptions of the proposed recipient and control areas under the No-Action Alternative and the proposed recipient and control sites under Alternatives 1 and 2, respectively. Detailed descriptions of the proposed recipient and control areas and sites are provided in Appendix A.

Regional Connectivity: Desert tortoise genetic studies suggest that its population structure is characterized by isolation-by-distance (i.e., the greater the distance that separate two populations, the more the populations would differ, and this differentiation occurs on a smooth gradient). These studies also suggest that, historically, levels of gene flow among subpopulations were likely high due to high levels of connectivity among habitat types, annual breeding among tortoises, and tortoise longevity (Murphy et al. 2007; Hagerty and Tracy 2010; Hagerty et al. 2011; USFWS 2011a). Historically, the main hindrance to genetic flow was the desert tortoise's relatively small home range size and limited dispersal ability of individuals as well as topographic features such as mountain ranges and areas with extreme climate conditions. Within the southern portion of the Western Mojave Recovery Unit, the transition between the Colorado and Mojave deserts is relatively subtle, especially when compared to the transition between the northeastern portion of the West Mojave Recovery Unit and the western border of the Eastern Mojave Recovery Unit, which is separated by the Baker Sink (an extremely hot and arid strip that extends from Death Valley to Bristol Dry Lake and Cadiz Valley). Today, however, urban development along California State Highway 62 now largely separates the Western Mojave and Colorado Desert recovery units (USFWS 2011a) (Figure 3.1-1). Based on research by Latch et al. (2011), roads may become increasingly important in shaping the evolutionary trajectory of tortoise populations.

Table 3.1-3. Characteristics of Desert Tortoise Recipient Areas (No-Action Alternative)

Area	Size (Acres)	Desert Tortoise Density	Predators	Land Uses	Associated Conservation Areas
Recipient Areas					
Ord-Rodman	23,475	0 to 12.9 tortoise/km ²	Ravens, Coyotes, and Domestic dogs	<ul style="list-style-type: none"> • Minor OHV recreation • Dirt roads • Transmission line corridor • Controlled grazing • Mining (historical) 	<ul style="list-style-type: none"> • Ord-Rodman ACEC 12,620 acres (4.7%) • Rodman Mountains Cultural Area 210 acres (3.4%)
Sunshine Peak	3,707	2.3 to 7.7 tortoise/km ²	Ravens, Coyotes, and Domestic dogs	<ul style="list-style-type: none"> • Training activities (few times per year, ordinance detonation/removal) 	<ul style="list-style-type: none"> • Within the Combat Center near the Sunshine Peak RTA Special Use Area
SEA	2,935	3.9 to 8.6 tortoise/km ²	Ravens, Coyotes, and Domestic dogs	<ul style="list-style-type: none"> • Minor OHV recreation • Family dwellings • Training activities (indirect) 	<ul style="list-style-type: none"> • Borders Cleghorn Lakes Wilderness Area
WEA	12,015	0 to 12.9 tortoise/km ²	Ravens, Coyotes, and Domestic dogs	<ul style="list-style-type: none"> • OHV recreation • Camping • Family dwellings • Communications • Mining (historical) • Training activities (indirect) 	<ul style="list-style-type: none"> • Borders Rodman Mountains Wilderness Area
Alternate Recipient Areas					
Bullion	2,417	8.7 to 18.1 tortoise/km ²	Ravens, Coyotes, and Domestic dogs	<ul style="list-style-type: none"> • Training activities, within the Combat Center 	<ul style="list-style-type: none"> • Borders Cleghorn Lakes Wilderness Area
Emerson Lake	2,417	3.0 tortoise/km ²	Ravens, Coyotes, and Domestic dogs	<ul style="list-style-type: none"> • Training activities, within the combat center 	<ul style="list-style-type: none"> • Within the Combat Center near the Emerson Lake RTA Special Use Area

Legend: ACEC = Area of Critical Environmental Concern; km² = square kilometer; OHV = Off-Highway Vehicle; SEA = Southern Expansion Area; WEA = Western Expansion Area.

Source: MCAGCC 2011.

**Table 3.1-4. Characteristics of Desert Tortoise Recipient and Control Sites
(Alternative 1 and Alternative 2)**

Site	Size (Acres)	Desert Tortoise Density	Predators	Land Uses	Associated Conservation Areas
Recipient Sites					
Lucerne-Ord	37,619	5.2 tortoise/km ²	Ravens Dogs/Coyotes	<ul style="list-style-type: none"> Limited Use OHV designation but possible proliferation anticipated Large transmission line corridor Overlaps Ord Mountain grazing allotment Dirt roads Mixture of federal and private lands Approximately 10 abandoned family dwellings within the release area (restricted to near the southern boundary) Scattered abandoned residents >6.6 km south of the release area 	Substantially overlaps: <ul style="list-style-type: none"> Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Ord-Rodman Tortoise Conservation Area
Rodman-Sunshine Peak North	26,078	4.9 tortoise/km ²	Ravens Dogs/Coyotes	<ul style="list-style-type: none"> Large transmission line corridor No projected future use of area Overlaps Ord Mountain grazing allotment ~3 km² All lands federally owned Dirt access roads Controlled grazing Training activities (few times per year, ordinance detonation/removal) 	Substantially overlaps: <ul style="list-style-type: none"> Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Sunshine Peak RTA Ord-Rodman Tortoise Conservation Area Bordered by Rodman Mountains Wilderness Area

**Table 3.1-4. Characteristics of Desert Tortoise Recipient and Control Sites
(Alternative 1 and Alternative 2) (continued)**

Site	Size (Acres)	Desert Tortoise Density	Predators	Land Uses	Associated Conservation Areas
Siberia ¹	13,399	2.6 tortoise/km ²	Dogs/Coyotes	<ul style="list-style-type: none"> Negligible recreation use, although gas pipelines provide ingress routes No projected use of Area 3 but large block of private lands in west - former proposed solar energy project Mixture of federal, state and private lands 	<p>In:</p> <ul style="list-style-type: none"> Mojave Trails National Monument Proposed ACEC (DRECP) <p>Overlaps:</p> <ul style="list-style-type: none"> Proposed National Landscape Conservation System (DRECP) <p>Borders the Combat Center</p>
Broadwell	10,121	5.1 tortoise/km ²	Dogs/Coyotes	<ul style="list-style-type: none"> Transmission line corridor No projected future use of area 	<p>Substantially overlaps:</p> <ul style="list-style-type: none"> Cady Mountains Wilderness Study Area Proposed National Landscape Conservation System (DRECP) Proposed ACEC (DRECP) Mojave Trails National Monument Near Kelso Dunes Wilderness Area
Cleghorn	2,321	6.5 tortoise/km ²	Dogs/Coyotes	<ul style="list-style-type: none"> Scattered occupied houses with dogs >6.5 km south 	<ul style="list-style-type: none"> Entirely on the Combat Center- Cleghorn Lake RTA Special Use Area Adjacent to Cleghorn Lakes Wilderness Area
Bullion (Alt 1) ²	13,073	10.4 tortoise/km ²	Not available	<ul style="list-style-type: none"> Training activities (indirect), borders the Combat Center 	<ul style="list-style-type: none"> Entirely on the Combat Center, partially within the Bullion RTA Special Use Area

**Table 3.1-4. Characteristics of Desert Tortoise Recipient and Control Sites
(Alternative 1 and Alternative 2) (continued)**

Site	Size (Acres)	Desert Tortoise Density	Predators	Land Uses	Associated Conservation Areas
Control Sites					
Rodman-Sunshine Peak South	13,563	6.0 tortoise/km ²	Ravens	<ul style="list-style-type: none"> • Residual Open OHV Area to the north (would be fenced with tortoise exclusion fencing) • Proposed expanded Open OHV Area to the west (Cook Bill) • Transmission line corridor • Dirt access roads 	<p>On the Combat Center Special Use Area Substantially overlaps:</p> <ul style="list-style-type: none"> • Ord-Rodman ACEC • Ord-Rodman Critical Habitat Unit • Proposed National Landscape Conservation System (DRECP) • Sunshine Peak RTA • Ord-Rodman Tortoise Conservation Area • Bordered by Rodman Mountains Wilderness Area
Daggett	6,183	9.5 tortoise/km ²	Ravens Dogs/Coyotes	<ul style="list-style-type: none"> • Transmission line corridor • Dirt roads • No projected future use of area 	<p>In:</p> <ul style="list-style-type: none"> • Ord-Rodman ACEC • Ord-Rodman Critical Habitat Unit • Proposed National Landscape Conservation System (DRECP) • Abuts Rodman Mountains Wilderness Area

**Table 3.1-4. Characteristics of Desert Tortoise Recipient and Control Sites
(Alternative 1 and Alternative 2) (continued)**

Site	Size (Acres)	Desert Tortoise Density	Predators	Land Uses	Associated Conservation Areas
Ludlow	3,054	3.0 tortoise/km ²	Dogs/Coyotes	<ul style="list-style-type: none"> Gas pipeline Dirt access road 	<p>In:</p> <ul style="list-style-type: none"> Mojave Trails National Monument Proposed ACEC (DRECP) <p>Overlaps:</p> <ul style="list-style-type: none"> Proposed National Landscape Conservation System (DRECP) <p>Near the Combat Center</p>
Calico ³	1,994	Not available	Dogs/Coyotes	<ul style="list-style-type: none"> Transmission line corridor (restricted to a small portion of the southeast corner) No projected future use of area 	<p>Substantially overlaps:</p> <ul style="list-style-type: none"> Proposed National Landscape Conservation System (DRECP) Proposed ACEC (DRECP) <p>Abuts</p> <ul style="list-style-type: none"> Mojave Trails National Monument Cady Mountains Wilderness Study Area
Cleghorn Control	1,964	12.1 tortoise/km ²	Dogs/Coyotes	<ul style="list-style-type: none"> Training activities, entirely on the Combat Center-Cleghorn Lake RTA Special Use Area Scattered occupied houses with dogs 5.5 km southeast 	<ul style="list-style-type: none"> Entirely on the Combat Center, in the Cleghorn Lake RTA Special Use Area Adjacent to Cleghorn Lakes Wilderness Area

**Table 3.1-4. Characteristics of Desert Tortoise Recipient and Control Sites
(Alternative 1 and Alternative 2) (continued)**

Site	Size (Acres)	Desert Tortoise Density	Predators	Land Uses	Associated Conservation Areas
Bullion Control (Alt 1) ²	2,010	29.0 tortoise/km ²	Not available	<ul style="list-style-type: none"> Borders the Combat Center 	<ul style="list-style-type: none"> Entirely in Cleghorn Lakes Wilderness Area Borders the Combat Center
Bullion Control (Alt 2) ⁴	2,136	10.4 tortoise/km ²	Not available	<ul style="list-style-type: none"> Training activities (indirect) 	<ul style="list-style-type: none"> On the Combat Center, entirely within Bullion RTA Special Use Area

Legend: ACEC = Area of Critical Environmental Concern; DRECP = Desert Renewable Energy Conservation Plan; km = kilometer; km² = square kilometer; MCAGCC = Marine Corps Air Ground Combat Center; OHV = off-highway vehicle; RTA = Range Training Area.

Note: ¹ Value represents the 62% of the 21,612 acre site that has a habitat suitability index of 0.6 or greater, derived from Barrows et al. (2016).

² Under the March 2016 Translocation Plan (MCAGCC 2016b:25) "Raven surveys have not been performed and mortality rates and trauma due to coyotes and dogs are under analysis..."

³ Health assessments have been performed on, and transmitters have been applied to, tortoises within the Calico control site; density surveys, however, have not been performed.

⁴ Under the June 2016 Translocation Plan (MCAGCC 2016c:25) "Raven surveys have not been performed and mortality rates and trauma due to coyotes and dogs are under analysis and would be completed prior to translocation..."

Sources: MCAGCC 2016b, c.

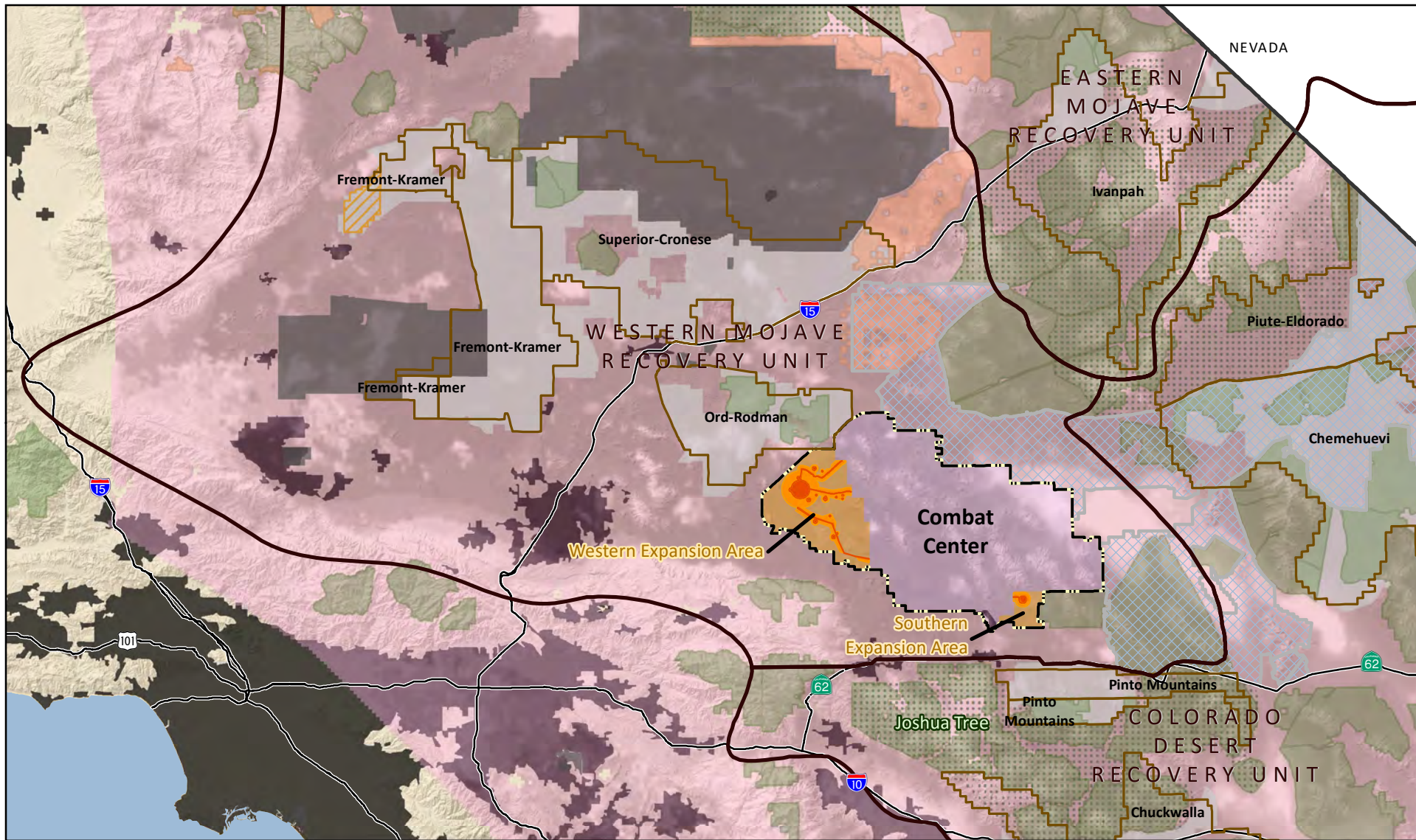
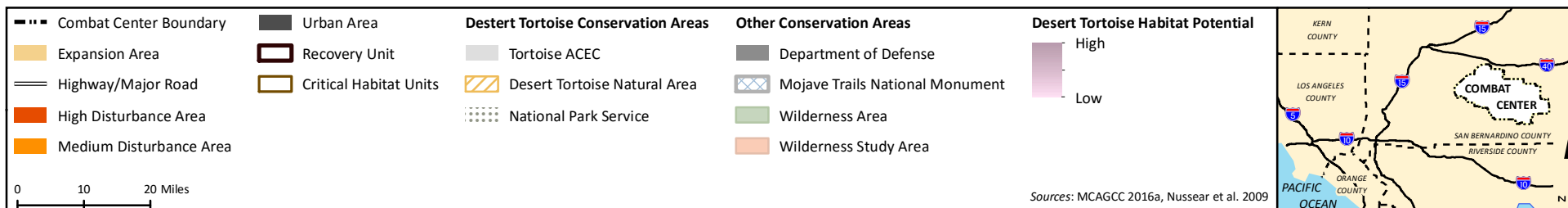


Figure 3.1-1. Desert Tortoise Regional Connectivity



Removal of desert tortoises from the medium- and high-impact training areas was previously analyzed in the Final 2012 EIS (refer to Section 4.10, *Biological Resources*, of the 2012 Final EIS).

Genetic Considerations: Murphy et al. (2007, 2012) analyzed genetic data to assess the validity of the six desert tortoise recovery units established in the 1994 Recovery Plan by the USFWS (USFWS 1994). Mitochondrial and nuclear DNA testing indicated a large amount of variation between tortoise populations in the Mojave Desert and those east of the Colorado River in the Sonoran Desert of Arizona, supporting the hypothesis that the desert tortoise is composed of two species, namely *G. agassizii* and *G. morakfai*. Results also supported the hypothesis of population structure as outlined in the 1994 Recovery Plan and the Desert Wildlife Management Units (now referred to as ACECs with publication of the DRECP ROD [BLM 2016b]) described in the Western Mojave Recovery Unit. A sub-analysis conducted on the Western Mojave Recovery Unit indicated that it could be divided into at least three geographic units, namely the Western, Southern, and Central Mojave regions. The authors recognized that the statistical analyses used, although not likely, may have been sensitive to the imbalances in their sample sizes. In addition, they emphasized that genetics may not coincide with phenotypic traits and adaptations; therefore, genetics should be only one of several factors considered in developing management plans for the desert tortoise (Crandall et al. 2000; DeSalle and Amato 2004; Green 2005) and designating recovery units. Acknowledging subjectivity in using genetic results to make management decisions, Murphy et al. (2007) suggest that the Western Mojave Recovery Unit should be divided into distinct western, southern, and central regions. The Combat Center, WEA, and SEA (i.e., the tortoise translocation donor sites), and the proposed control and recipient sites (under all alternatives) are located within the Southern Mojave region proposed by Murphy et al. (2007).

The 1994 Recovery Plan recognizes the Southern, Western, and Central regions within the Western Mojave Recovery Unit based on differences in climate and vegetation, but it does not designate them as separate management units (USFWS 1994). While the updated 2011 Recovery Plan recognizes Murphy's genetic analyses that indicate some genetic variation within the Western Mojave Recovery Unit, the plan maintains the original 1994 designation of the whole unit (USFWS 2011a). The sub-structuring in the Western Mojave Recovery Unit indicated by Murphy et al. is contradicted by an alternate study that looked at the genetic structure within the unit using more continuous sampling methods (Hagerty and Tracy 2010). Furthermore, independent genetic testing done by Hagerty et al. (2011) also indicates a history of gene flow throughout the Western Mojave Recovery Unit. Therefore, the 2011 Plan contends that the genetic differentiation seen by Murphy et al. (2007) within the Western Mojave Recovery Unit may be an artifact of discrete sampling within generally continuous habitat (Allendorf and Luikart 2007).

Current Tortoise Density and Population Trends: In 2014, estimated adult desert tortoise density in the Western Mojave Recovery Unit ranged from 6.5 to 12.2 individuals per square mile (2.5 to 4.7 individuals per km²), with an overall average density of 7.3 tortoises per square mile (2.8 tortoises per km²), the result of an overall downward trend in the population of adult tortoises (Jacobsen et al. 1994; Brown et al. 1999; Freilich et al. 2000; USFWS 2015). In the recent past, from 2004 to 2014, desert tortoise populations among all recovery units decreased between 27 – 67%, except for the Northeastern Mojave Recovery Unit that increased by 270%; in the Western Mojave Recovery Unit, the adult tortoise population decreased by 51% between 2004 and 2014 (USFWS 2015). Lovich et al. (2014) also found a steep decline of over 75% from 1996 to 2012 in the adult desert tortoise population at a 1 square mile (2.59 km²) study site, known as Barrow Plot, located at the nearby Joshua Tree National Park. The low tortoise density in the West Mojave Recovery Unit in general, and within the proposed project area (see Tables 3.1-3 and 3.1-4), is of particular concern as it has been suggested that the minimum adult tortoise

density necessary to sustain a viable population, assuming there is no gender bias, is 10 individuals per square mile (3.85 individuals per km²) (USFWS 1994, 2016a).

Disease: Impacts from disease on desert tortoises can be varied and often times subtle. Disease can inhibit or slow growth rates, reduce appetite (which can result in malnutrition), reduce reproductive vigor, and in turn reduce survivorship (Homer et al. 1998). As reported by Rideout (2015), seven transmissible infectious agents are known to cause or be associated with disease in desert tortoises¹:

1. *Mycoplasma agassizii*
2. *Mycoplasma testudineum*
3. Tortoise herpesvirus-2 (TeHV-2)
4. *Chlamydophila* sp.
5. *Pasteurella testudinis*
6. *Salmonella* spp.
7. *Cryptosporidium* spp.

Mycoplasma agassizii (in particular), as well as *Mycoplasma testudineum*, cause Upper Respiratory Tract Disease (Rideout 2015). Upper Respiratory Tract Disease has been found in several populations that have experienced high mortality rates, including some in the west Mojave, and is probably the most important infectious disease affecting desert tortoises (USFWS 2011a). Studies conducted by Berry et al. (2006, 2015) found that populations that were closer to human populated areas had a higher prevalence of tortoises with Upper Respiratory Tract Disease. They concluded that management strategies such as signing and fencing of critical habitats in close proximity to human households and urban areas could help with reduction of disease transmission.

Climate Change: Studies suggest that a decline of the desert tortoise population in recent decades is related to the effects of persistent drought. As climate change advances, projected warming and drying would limit suitable habitat for the desert tortoise and lead to a continued decline in the desert tortoise population (Barrows 2011; Lovich et al. 2014; Barrows et al. 2016). As a result of the tortoises' limited mobility to move long distances, it becomes more critical to conserve and identify refugia lands that would remain suitable under the projected climate change.

¹ Rideout (2015) also identified eight other transmissible infectious agents as plausible pathogens in desert tortoises.

3.2 LAND USE

3.2.1 Definition of Resource

Land use refers to the various ways in which land might be used or developed (i.e., military training, parks and preserves, agriculture, commercial), the kinds of activities allowed (i.e., factories, mines rights-of-way, etc.), and the type and size of structures permitted (i.e., towers, single family homes, multi-story office buildings). Land use is regulated by management plans, policies, ordinances, and regulations that determine the types of uses that are allowable and protect specially designated areas and environmentally sensitive resources, as described below.

The project area for the land use analysis includes the following components: the Combat Center and the recipient and control areas/sites located outside the Combat Center. Information relevant to land use is also contained in Section 3.1, *Biological Resources*, and Section 3.4, *Cultural Resources*. Much of this area comprises public land. Key sources of information for existing conditions include government data sources, for example CDCA resource management plans and associated environmental impact studies adopted by the BLM; the Combat Center INRMP; Combat Center Master Plan; OHV area management plans; and the San Bernardino County General Plan.

In the section below, the regulatory environment is described first, followed by a description of Combat Center land use, and areas located outside the Combat Center.

3.2.2 Regulatory Framework

The primary federal, state, and local statutes and regulations that pertain to land use are identified below and described in detail in the 2012 Final EIS (Volume 1, Chapter 3: Affected Environment, Section 3.1 *Land Use*, Section 3.1.2, *Regulatory Framework*, pages 3.1-2 to 3.1-4).

3.2.2.1 Federal

- Federal Land Policy and Management Act
- California Desert Conservation Area Plan
- Integrated Natural Resources Management Plan
- EO 11644, amended by EO 11989 – Use of Off-Road Vehicles on the Public Lands
- Combat Center Master Plan
- Presidential Proclamation – Establishment of the Mojave Trails National Monument

3.2.2.2 State

- California State Lands Commission – School Land Grant of 1853

3.2.2.3 Local

- San Bernardino County General Plan

3.2.3 Scope of Analysis

The analysis of potential land use impacts associated with the proposed desert tortoise translocation is focused on the translocation of tortoises and associated fence installation, etc., and does not anticipate any modification to current or future anticipated land uses.

The process used to identify proposed recipient and control areas/sites considered current and anticipated future land uses, as described in the 2011 GTP and further refined in the March and June Translocation Plans (Appendix A). As a result, there is negligible potential to impact several land uses that were covered in detail in the 2012 Final EIS. These land uses are dismissed from further analysis based on the following general rationale and additional specific discussion provided in the subsections below.

- **Mining:** Mines and mining claims are located within the proposed recipient and control area/sites. The 2012 Final EIS analyzed impacts to mining within the WEA and SEA due to land acquisition. For areas located outside the Combat Center, claim owners would continue to have access to their claims so that the proposed translocation would not affect mining activity during translocation or in the future. Any mining activity that does occur would comply with permit requirements. Most mine claims are located in the mountains surrounding desert tortoise habitat, so mining activities would be located away from desert tortoise habitat and would not directly impact translocated tortoises. Therefore, mining is not further analyzed in this SEIS.
- **Utilities.** As discussed at the beginning of Chapter 3, utilities impacts would be avoided; therefore, utilities are not further analyzed in this SEIS.

3.2.4 Existing Conditions

The existing conditions for land use are consistent with the existing conditions description in the 2012 Land Acquisition/Airspace Establishment EIS (Volume 1, Chapter 3: Affected Environment, Section 3.1, Land Use, Section 3.1.3, *Existing Conditions*, pages 3.1-5 to 3.1-22). The areas affected by the alternatives in this SEIS are summarized below for reference along with any new or additional information since the 2012 Land Acquisition/Airspace Establishment EIS was published.

3.2.4.1 Combat Center

The Combat Center is the Marine Corps' largest combined-arms, live-fire training range complex, encompassing 766,000 acres (310,000 ha). The Combat Center is divided into multiple training areas. Training areas are functional units that enable different types of training to be conducted simultaneously without jeopardizing safety. Certain portions of the Combat Center are also managed to provide for training support and safety, as well as the protection of specific natural resources.

Training Areas

The entire installation has been designated as a single training range, though for scheduling purposes it is divided into multiple training areas and the Mainside and Camp Wilson support areas (see Figure 1.1-1). The boundaries of training areas, though not marked, are defined by training requirements, topography, and other constraints. Training areas vary in size, use, terrain, and training restrictions. Restrictions are characterized as either Category 1 Special Use Areas (restricted areas) or Category 2 Special Use Areas (sensitive areas). Category 1 Special Use Areas prohibit digging, ground disturbance, bivouacking, OHV use, and/or training that involves vehicle activity outside of a MSR. Category 2 Special Use Areas are sensitive areas where training may occur, but personnel are warned that these areas have sensitive natural resources, cultural resources, or utilities. The training areas that are located within proposed recipient and control areas and areas/sites are identified in Table 3.2-1.

Table 3.2-1. Combat Center Training Areas Potentially affected by Translocation

Training Area	Size (acres)	Description
Bessemer Mine	49,818	The Bessemer Mine Training Area is located at the western boundary of Combat Center within the WEA and to the north of the Means Lake (Shared Use Area) Training Area. A Category 1 Special Use Area is located in the northern portion of the Bessemer Mine Training Area and extends into the Galway Lake Training Area.
Bullion	28,129	The Bullion Training Area is located to the west of America Mine Training Area and is used for aviation bombing and strafing, gunnery practice, artillery, and infantry maneuvers. A Category 1 Special Use Area is located at the southern portion of the Bullion Training Area and a smaller Category 2 Special Use Area is located to the north of this.
Cleghorn Lake	17,653	The Cleghorn Lake Training Area is located within the SEA. A Category 1 Special Use Area is located in the northeastern portion of the Cleghorn Lake Training Area.
Emerson Lake	32,287	The Emerson Lake Training Area is located at the western boundary of Combat Center and is used for tank maneuvers, aviation bombardment, and aerial targetry. Principal use occurs during Integrated Training Exercise and Final Exercises. A Category 1 Special Use Area and a Category 2 Special Use Area are located at the western and southwestern portion of the Emerson Lake Training Area, respectively. The Category 2 Special Use Area extends into the Acorn Training Area to the south.
Galway Lake	38,582	The Galway Lake Training area is located within the WEA, to the east of Bessemer Mine Training Area, and to the north of the Means Lake (Shared Use Area) Training Area. A Category 1 Special Use Area is located in the northern portion of the Galway Lake Training Area and extends into the Bessemer Mine Training Area.
Means Lake (Shared Use Area)	53,231	The Means Lake (Shared Use Area) Training Area is located in the southern portion of the WEA. The Shared Use Area is available for public recreation 10 months per year and for military training during two 30-day periods each year. The BLM will manage the Shared Use Area primarily for recreation during the 10 months of the year when the area will be open to public access. The Marine Corps will manage the area primarily for military purposes during the two 30-day periods that the area will be used for military training.
Sandhill	15,810	The Sand Hill Training Area is located at the far southwestern border of the Combat Center and is used for maneuvers. Portions of the Exercise Support Base and Expeditionary Airfield, as well as Assault Landing Zone Sand Hill, are located within the Sand Hill Training Area. Portions of three Category 1 Special Use Areas occupy the northeastern end and a Category 2 Special Use Area occupies the majority of the western and southern parts of the Training Area. Live-fire is not conducted due to proximity to Mainside which is located to the east.
Sunshine Peak	22,858	The Sunshine Peak Training Area is located at the far northwestern area of the Combat Center. This area is seldom used. When used, its primary use is an emergency aerial ordnance drop zone. This area is considered a "No Fire/Maneuver Area." Sunshine Peak is a restricted sensitive fuse area only accessible by EOD personnel. Three Category 1 Special Use Areas are located in the Sunshine Peak Training Area, with the northern Special Use Area extending into the Lavic Lake Training Area.

Legend: BLM = Bureau of Land Management; EOD = Explosive Ordnance Disposal; SEA = Southern Expansion Area; WEA = Western Expansion Area.

3.2.4.2 Areas Surrounding the Combat Center

Land Ownership Status

Much of the area adjacent to the Combat Center contains public lands administered by BLM (Figure 3.2-1). The Rodman Mountains and Cleghorn Lakes Wilderness Areas, Cady Mountains Wilderness Study Area, and the newly designated Mojave Trails National Monument are BLM-administered and overlap proposed recipient and control areas/sites. Non-federal land is defined as real property interests that are generally privately owned; however it also can include local/regional government owned, state-owned school lands, or some other miscellaneous real property interest. These lands include, but are not limited to, private real property, local government real property, rights-of-way, mining claims, local water district real property, or utility agency real property. In addition to fee ownership of lands mentioned above, other types of interests include uses such as mining claims, grazing allotments, and utility/transportation rights-of-way are present, primarily within the west and east study areas. The San Bernardino County General Plan land use designation in the vicinity of the proposed recipient and control areas/sites is open space.

Specific Land Uses

Specific land use topics are discussed in greater detail below.

Recreation and Off-Highway Vehicle Use

The Johnson Valley OHV Recreation Area is approximately 43,000 acres (17,400 ha) and is located to the west and north of the WEA (Figure 3.2-2). This area is open to the public year-round and is adjacent to the Shared Use Area that is designated to be open to the public at least 10 months of the year. The Johnson Valley OHV Recreation Area is managed by the BLM and the Shared Use Area is also managed by the BLM while open to the public. This OHV area is an open area where OHV use is not restricted to specific trails. The Johnson Valley OHV Recreation Area contains rugged terrain for OHV use. Other types of recreation use in the area include hiking, sight-seeing, photography, rock-hounding, camping, and wildlife viewing.

Grazing

A total of 31 public land grazing allotments (designated areas suitable for grazing) are present within the West Mojave planning area. The types of livestock and forage allocation for allotments are designated in BLM's CDCA Plan (BLM 2006). Allotments are ephemeral, perennial, or ephemeral/perennial based on the type of forage that is available. Cattle, sheep, and horses, or a combination, may be authorized to graze on an allotment. Depending on the type of lease, livestock producers apply to graze livestock annually or as conditions permit. Grazing use is allowed with written authorization and terms and conditions for grazing listed as necessary.

Ord Mountain Grazing Allotment contains 154,970 acres (62,714 ha) and is located to the northwest of the WEA (Figure 3.2-2). Approximately 90% of the allotment is on Public Land and is classified for perennial grazing use, with year-round grazing allowed whenever forage is available, and is designated for cattle. Portions of the allotment contain critical habitat for the desert tortoise. The allotment permits 3,632 active Animal Unit Months.

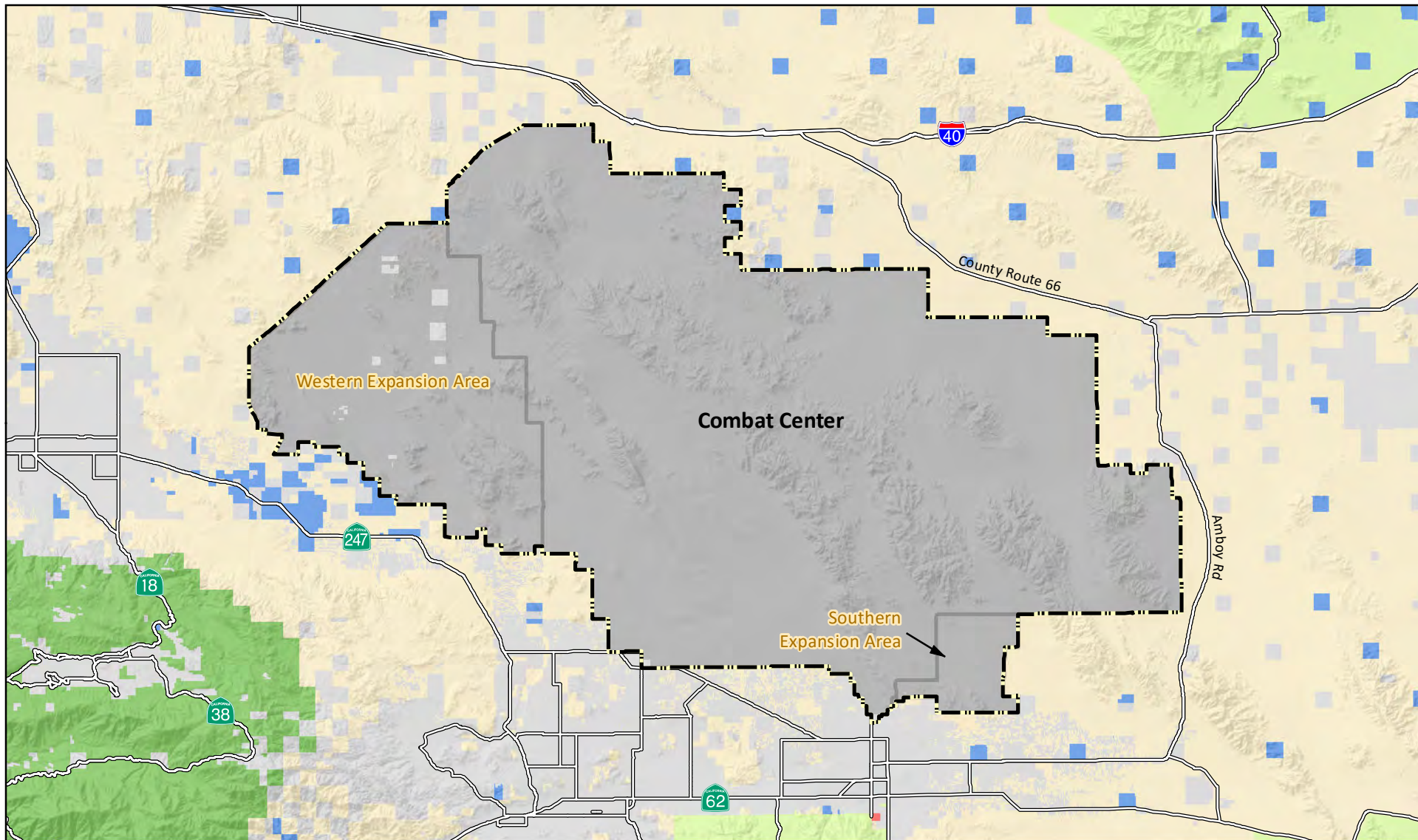
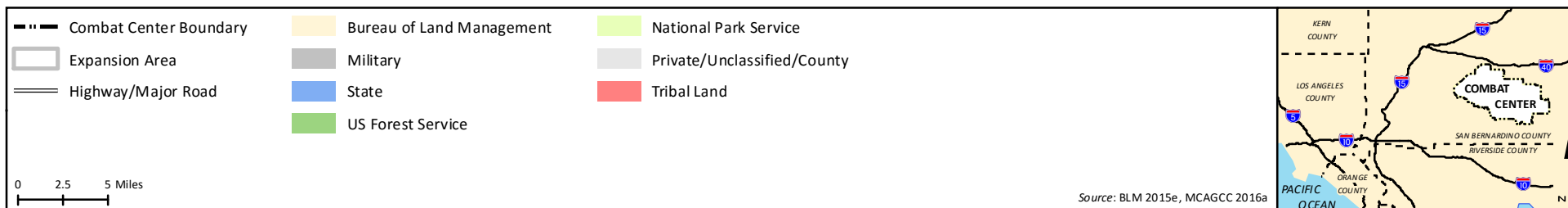


Figure 3.2-1. Land Use



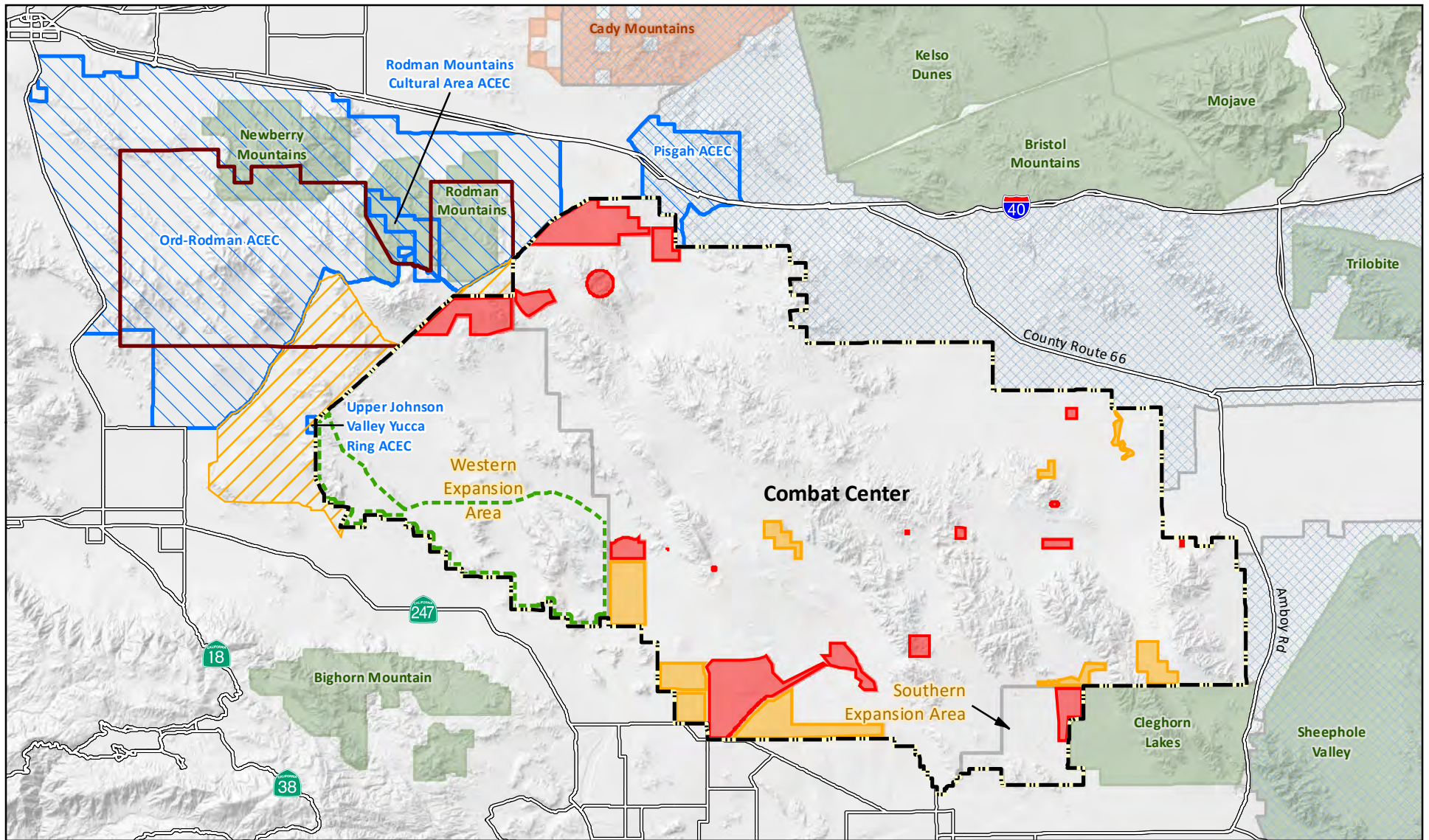
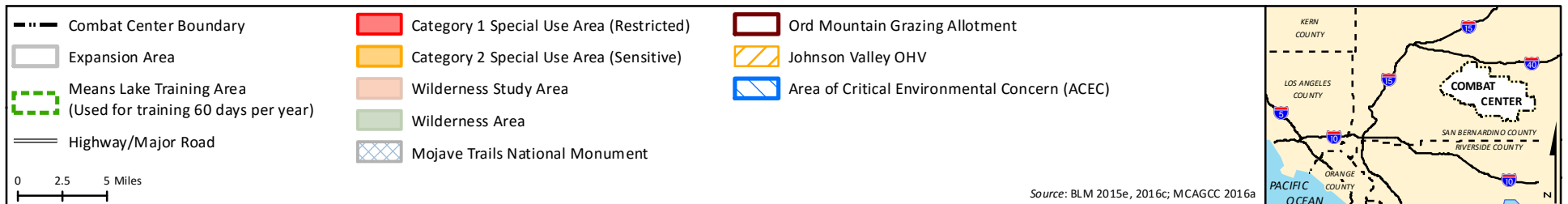


Figure 3.2-2. Specific Land Uses



Conservation Areas

The following conservation areas are located within the project area and shown on Figure 3.2-2:

- ***Areas of Critical Environmental Concern*** (ACECs) are areas within BLM-managed lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes, or to protect life and safety from natural hazards.
 - *Ord-Rodman ACEC.* The Ord-Rodman Critical Habitat Unit and ACEC are located immediately north and west of the WEA (Figure 3.2-2). Together, they comprise over 276,756 acres (112,000 ha).
 - *Rodman Mountains Cultural Area ACEC.* The Rodman Mountains Cultural Area ACEC is located north of the WEA and overlaps the Rodman Mountains Wilderness Area.
- ***Mojave Trails National Monument.*** As shown in Figure 3.2-2, the Mojave Trails National Monument is located north and east of the Combat Center and overlaps proposed recipient and control sites. The Mojave Trails National Monument was designated by Presidential Proclamation in February 2016 and encompasses approximately 1.6 million acres (647,500 ha) of federal lands currently managed by the BLM between Barstow and Needles, California. The Mojave Trails National Monument contains approximately 358,000 acres (145,000 ha) of established wilderness areas and 84,400 acres (34,200 ha) currently managed by the BLM as the Cady Mountains Wilderness Study Area. The monument also protects irreplaceable historic resources including ancient Native American trading routes, World War II-era training camps, and the longest remaining undeveloped stretch of Route 66. The designation preserves and enhances public access, such as for hunting and fishing, which continue to be managed by the State of California. Motorized vehicle use is limited to roads existing as of the date of the proclamation. The BLM is currently developing a Mojave Trails National Monument Management Plan.

Wilderness Areas

As shown in Figures 2.1-1, 2.2-1, 2.3-1, and 3.2-2, several wilderness areas and one wilderness study area are located in the vicinity of the Combat Center. Proposed recipient and/or control areas/sites would overlap two Wilderness Areas (Rodman Mountains and Cleghorn Lakes) and one Wilderness Study Area (Cady Mountains). These wilderness areas are BLM-administered parts of the National Landscape Conservation System, which consists of areas that Congress or the President have established to protect, conserve, and restore the natural and heritage resources on the public lands. As defined in the Wilderness Act of 1964, “a wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” These can include hiking, backpacking, photography, dry camping, and rock-hounding to name a few. Wilderness Areas are to be managed to retain their “primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions...” (BLM 2012a). Wilderness study areas are designated lands that meet the criteria of the Wilderness Act and are managed as wilderness by their parent agency, pending final determination by Congress.

Important characteristics of wilderness areas (as described in Section 2(c) of the Wilderness Act) that are relevant to the analysis in this SEIS include:

- An area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain;
- Retention of primeval character and influence, without permanent improvements or human habitation;
- Land that is affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
- Provides outstanding opportunities for solitude or a primitive and unconfined type of recreation; and
- Contains ecological, geological, or other features of scientific, educational, scenic, or historical value.

Section 4(c) of the Wilderness Act also describes specific land uses and activities that are prohibited in wilderness areas. Except as specifically provided for in the Act, and subject to existing private rights, the following are prohibited within any designated wilderness area: commercial enterprises; permanent or temporary roads; motor vehicles, motorized equipment or motorboats; landing of aircraft; any other form of mechanical transport; and structures or installations, which includes mobile devices: “including, but not limited to, radio collars or other remote tracking devices when they are installed in the wilderness” (BLM 2012b).

The two wilderness areas and one wilderness study area potentially affected by the proposed action are described briefly below. All three are managed by the BLM.

- **Rodman Mountains Wilderness Area:** Designated by Congress in 1994, this wilderness area comprises 34,264 acres of colorful escarpments, calico-colored mountains, maze-like canyons, and broad alluvial plains or bajadas located near the northwestern boundary of the Combat Center. Several natural water “tanks” are located within a lava flow area that bisects the wilderness area from northwest to southeast. This wilderness area is one of only seven core raptor breeding areas in the desert, supporting prairie falcons and golden eagles.
- **Cleghorn Lakes Wilderness Area:** Also designated in 1994, this wilderness area located adjacent to the southeastern corner of the Combat Center comprises 39,167 acres and features dry lakes, a portion of the rugged Bullion Mountains, and a large bajada. The Bullion Mountains portion of the wilderness area includes habitat for desert bighorn sheep and desert tortoises are known to inhabit the valley floors.
- **Cady Mountains Wilderness Study Area:** This large wilderness study area encompasses 84,400 acres a few miles north of the Combat Center and adjacent to a portion of the Desert Trails National Monument. It is home to desert bighorn sheep, prairie falcons, golden eagles, and other desert wildlife.

3.3 AIR QUALITY

3.3.1 Definition of Resource

3.3.1.1 Criteria Pollutants

Air quality at a given location is described by the concentrations of various pollutants in the atmosphere. The air quality analysis for this SEIS focuses on the concentrations of volatile organic compounds (VOCs), ozone (O₃), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂) particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter (PM₁₀), and particulate matter less than or equal to 2.5 microns in diameter (PM_{2.5}). Although VOCs or NO_x (other than nitrogen dioxide [NO₂]) have no established ambient air quality standards, they are important as precursors to O₃ formation.

3.3.1.2 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most significant of the human activities emitting GHGs is the burning of fossil fuels. The accumulation of GHGs in the atmosphere regulates the earth's temperature. Scientific evidence indicates a trend of increasing global temperature over the past century correlating with an increase in GHG emissions from human activities.

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride. Each GHG is assigned a global warming potential, which is the ability of a gas or aerosol to trap heat in the atmosphere. The global warming potential scale is standardized to CO₂, which has a value of one. For example, CH₄ has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO₂ on an equal-mass basis. CO₂ is the dominant gas in terms of quantities of total GHG emissions, although other GHGs have a higher global warming potential than CO₂. Total GHG emissions from a source are often reported as a CO₂ equivalent (CO₂e). The CO₂e is calculated by multiplying the emissions of each GHG by its global warming potential and adding the results together to produce a single, combined emission rate representing all GHGs.

3.3.2 Regulatory Framework

3.3.2.1 Criteria Pollutants

Criteria pollutants have national and/or state ambient air quality standards. The U.S. Environmental Protection Agency (USEPA) establishes the National Ambient Air Quality Standards (NAAQS), while the California Air Resources Board (CARB) establishes the state standards, termed the California Ambient Air Quality Standards (CAAQS) (CARB 2016a). The Mojave Desert Air Quality Management District has been delegated the authority to enforce the federal and state standards in the project area. Table 3.3-1 provides the NAAQS and CAAQS as of 2016.

Table 3.3-1. California and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards ¹ Primary ^{2,3}	National Standards ¹ Secondary ^{3,4}
O ₃	1-hour	0.09 ppm (180 µg/m ³)	—	—
O ₃	8-hour	0.070 ppm (137 µg/m ³)	0.075 ppm (147 µg/m ³)	Same as primary
CO	1-hour	20 ppm (23 mg/m ³)	35 ppm (40 mg/m ³)	—
CO	8-hour	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)	—
NO ₂	1-hour	0.18 ppm (339 µg/m ³)	0.10 ppm (188 µg/m ³)	—
NO ₂	Annual	0.030 ppm (57 µg/m ³)	0.053 ppm (100 µg/m ³)	Same as primary
SO ₂	1-hour	0.25 ppm (655 µg/m ³)	0.075 ppm (105 µg/m ³)	—
SO ₂	3-hour	—	—	0.5 ppm (1,300 µg/m ³)
PM ₁₀	24-hour	50 µg/m ³	150 µg/m ³	Same as primary
PM ₁₀	Annual	20 µg/m ³	—	Same as primary
PM _{2.5}	24-hour	—	35 µg/m ³	Same as primary
PM _{2.5}	Annual	12 µg/m ³	15 µg/m ³	Same as primary
Lead	30-day average	1.5 µg/m ³	—	—
Lead	Rolling 3-month average	—	0.15 µg/m ³	Same as primary
Lead	Calendar Quarter	—	1.5 µg/m ³	Same as primary
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m ³)	No National Standards	No National Standards
Vinyl Chloride	24-hour	0.01 ppm (26 µg/m ³)	No National Standards	No National Standards
Visibility Reducing Particles	8-hour	In sufficient amount to produce an extinction coefficient of 0.23 per km when the relative humidity is less than 70%. Measurement in accordance with CARB Method V.	No National Standards	No National Standards

Legend: µg/m³ = micrograms per cubic meter; CO = carbon monoxide; mg/m³ = milligrams per cubic meter; NO₂ = nitrogen dioxide; O₃ = ozone; PM_{2.5} = particulate matter less than or Equal to 2.5 Microns in Diameter; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; ppm = parts per million; SO₂ = sulfur dioxide.

Notes: ¹ Standards other than 1-hour O₃, 24-hour PM₁₀, 24-hour PM_{2.5}, and those based on annual averages cannot be exceeded more than once a year.

² Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.

³ Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the USEPA.

⁴ Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse pollutant effects.

Source: CARB 2016a.

Section 176(c) of the Clean Air Act (CAA), as articulated in the USEPA General Conformity Rule, states that a federal agency cannot issue a permit or support an activity unless the agency determines that the action would conform to the most recent USEPA-approved State Implementation Plan (SIP). This means that projects using federal funds or requiring federal approval in nonattainment or maintenance areas must not: (1) cause or contribute to any new violation of a NAAQS; (2) increase the frequency or severity of any existing violation; or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone. Certain actions are exempt from conformity determinations if the projected emission rates would be less than specified emission rate thresholds, known as *de minimis* thresholds. The applicable *de minimis* levels for the project area are listed in Table 3.3-2.

Table 3.3-2. Applicable Criteria Pollutant *de minimis* Levels (tons/year)

VOCs ¹	NO _x ¹	CO	SO ₂	PM ₁₀	PM _{2.5}
25	25	NA	NA	100	NA

Legend: CO = carbon monoxide; NO_x = nitrogen oxides; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; SO₂ = sulfur dioxide; VOC = volatile organic compound.

Notes: ¹ The Mojave Desert Air Basin (MDAB) is a severe nonattainment area for the 8-hour O₃ NAAQS (VOCs and NO_x are precursors to the formation of O₃), and is a moderate nonattainment area for PM₁₀.

NA = Not Applicable because the MDAB is currently in attainment of the NAAQS for these criteria pollutants.

Source: USEPA 2016a.

3.3.2.2 Greenhouse Gases

Federal agencies are addressing emissions of GHGs by mandating GHG reductions in federal laws and EOs, most recently in EO 13693, *Planning for Federal Sustainability in the Next Decade* (EO 13693 superseded EO 13423, *Strengthening Federal Environment, Energy, and Transportation Management* and EO 13514, *Energy Efficient Standby Power Devices*). In 2009, the USEPA signed GHG Endangerment Findings under Section 202(a) of the CAA, stating that six “key” GHGs are a threat to public health and welfare (CO₂, CH₄, N₂O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). Since then, the USEPA has been creating standards and regulations for controlling GHG emissions from passenger vehicles. In June 2012, the D.C. Circuit U.S. Court of Appeals upheld the GHG regulations under the CAA. Additionally, since 2012 the USEPA has issued proposals and updated regulations to reduce carbon emissions from new and existing power plants, landfills, and oil and natural gas facilities. Despite these efforts, there are no promulgated federal regulations to date limiting GHG emissions. In August 2016, the CEQ issued final guidance for federal agencies, to provide guidance on when and how to consider the effects of GHG emissions and climate change in their projects (CEQ 2016).

Several states have passed GHG-related laws as a means to reduce statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 (Assembly Bill 32) directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020. EO S-20-06 further directs state agencies to begin implementing Assembly Bill 32, including the recommendations made by the state’s Climate Action Team. Activities taken thus far to implement Assembly Bill 32 include mandatory GHG reporting and a cap-and-trade system for major GHG-emitting sources (CARB 2016b). On August 26, 2016, California Assembly Bill 197 was passed by the Senate, and is pending signature by the Governor of California before it becomes law. Assembly Bill 197 would require the state to reduce emissions to 40% below 1990 levels by 2030. Additionally, a committee would be established to oversee California’s climate programs.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with goals set by EO 13693 and the Energy Policy Act of 2005, the DON has implemented a number of renewable energy projects. The types of projects currently

in operation within military installations include thermal and photovoltaic solar energy systems, geothermal power plants, and wind energy generators.

The potential effects of GHG emissions are by nature global and cumulative, and it is impractical to attribute climate change to individual projects. Therefore, the impact of GHG emissions associated with this project is discussed in the context of cumulative impacts in Section 5.4.3 of this SEIS.

3.3.3 Existing Conditions

3.3.3.1 Climate and Meteorology

The climate of the project area is classified as arid continental, characterized by hot summers, mild winters, low humidity, and large diurnal variations in temperature. This arid condition produces low soil moisture and a high potential for fugitive dust emissions (PM₁₀), which is one of the main air pollution issues in the region. Climate and meteorological data collected for the city of Twentynine Palms are used to describe the climatic conditions of the project area (Western Region Climate Center 2016).

The project area is within the Mojave Desert, which is one of the driest regions in the U.S. This condition occurs because (1) the region is at the southern extent of the track of wintertime North Pacific storms; (2) rain shadow effects of the Coast Ranges; and (3) the region is at the western fringe of the summertime monsoon regime, whose moisture sources originate from the Gulf of Mexico and Gulf of California. The annual average precipitation at Twentynine Palms is about 4 inches (10 cm). Monsoon rains, which generally occur between the months of July through September, produce about 40% of the annual rainfall at Twentynine Palms. The average high and low temperatures at Twentynine Palms during the summer months range from about 105°F to 63°F (40.6°C to 17.2°C). The average high and low temperatures during the winter months range from 72°F to 36°F (22.2°C to 2.2°C). The low humidity in the region is responsible for the large diurnal variations in temperature.

Concurrent with the presence of the Eastern Pacific High west of California, a thermal low pressure system persists in the interior desert region due to intense solar heating. The resulting pressure gradient between these two systems produces a west to northwest air flow across the Twentynine Palms region for most of the year.

3.3.3.2 Baseline Air Quality

The USEPA designates all areas of the U.S. as having air quality better than or worse than the NAAQS, termed as attainment and nonattainment, respectively. An area generally is in nonattainment for a pollutant if the NAAQS has been exceeded more than once per year. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. The southwestern portion of San Bernardino County located within the South Coast Air Basin (in the Los Angeles and San Bernardino urban areas) is an “extreme” O₃ nonattainment area. Per 42 USC § 7511d, if an area in extreme or severe ozone nonattainment fails to attain the NAAQS by the planned attainment date, then each major stationary source of VOCs located within the area shall pay a fee to the state for each calendar year until the area is redesignated as an attainment area for ozone. Presently, the Mojave Desert Air Basin (MDAB) attains the NAAQS for all criteria pollutants except O₃. The portions of the MDAB that encompass the project area are rated as severe O₃ nonattainment areas. The MDAB has until 2020 to attain the NAAQS standard. The San Bernardino County portion of the MDAB is in moderate nonattainment of PM₁₀ (CARB 2016c; USEPA 2016b).

CARB also designates areas of the state that are in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if the CAAQS have been exceeded more than once in 3 years. Presently, the MDAB attains the CAAQS for all criteria pollutants except O₃, PM₁₀, and PM_{2.5} (CARB 2016c).

The MDAB is currently in nonattainment for O₃. Ozone concentrations are highest during warmer months of the year and coincide with the period of maximum insolation. Maximum O₃ concentrations tend to be homogeneously spread throughout a region, since it often takes several hours to convert precursor emissions to O₃ in the atmosphere. Ozone precursor emissions transported from the South Coast Air Basin are the main contributors to high O₃ levels in the nearby MDAB. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime/early morning surface-based temperature inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

As discussed above, the MDAB is also currently in moderate nonattainment for PM₁₀. Ambient PM₁₀ concentrations within the project region occur from emissions of fugitive dust and the combustion of fuel in vehicles. Maximum PM₁₀ impacts occur in combination with fugitive dust generated by ground-disturbing activities (such as the operation of vehicles on unpaved surfaces) and high wind events.

The NREA at the Combat Center has operated an air monitoring program at the Combat Center since 1996. Currently, the NREA operates two stations that sample for PM₁₀ within the southern region of the Combat Center. The Mainside area of the Combat Center also samples for gaseous pollutants (Naval Facilities Engineering Service Center 2009). The purpose of the program is to characterize air quality trends and to address state and regional air monitoring initiatives. The program occurs in partnership with the Mojave Desert Air Quality Management District. Table 3.3-3 summarizes the maximum ambient pollutant data monitored at the Mainside monitoring station during the 5-year period between 2003 and 2009 (the most recent dates for which data is available). These data show that other than O₃ and PM₁₀, the ambient air quality concentrations at this location are well below CAAQS and NAAQS values. Ambient air quality levels at locations distant from Mainside that are within the existing Combat Center or proposed acquired land boundaries have air quality readings that are similar to or lower than those at Mainside. The Mainside values are generally higher because the monitoring site is in proximity to (1) mobile and stationary sources of combustive emissions, and (2) areas of disturbed lands and bare soils that emit fugitive dust. Table 3.3-4 presents data from the Joshua Tree National Park O₃ monitoring station, located approximately 20 miles west of the Combat Center. This monitoring station is currently the closest data point to the Combat Center.

Table 3.3-3. Maximum Pollutant Concentrations Measured at the Mainside Monitoring Station

Pollutant	Averaging Period	National Standard	State Standard	Highest Monitored Concentration ¹ 2003	Highest Monitored Concentration ¹ 2004	Highest Monitored Concentration ¹ 2005	Highest Monitored Concentration ¹ 2008	Highest Monitored Concentration ¹ 2009
O ₃ (ppm)	1-hour	NA	0.09	0.111	0.095	0.106	0.093	0.087
O ₃ (ppm)	8-hour	0.075	0.07	0.076	0.080	0.081	0.077	0.073
CO (ppm)	1-hour	35	20	1.0	0.7	0.7	1.2	3.6
CO (ppm)	8-hour	9	9	0.8	0.3	0.6	1.0	2.4
NO ₂ (ppm)	1-hour	0.10	0.18	0.028	0.058	0.025	0.025	0.03
NO ₂ (ppm)	Annual	0.053	0.03	0.005	0.004	0.004	0.003	0.004
SO ₂ (ppm)	1-hour	0.075	0.25	0.020	0.005	0.006	0.010	0.011
SO ₂ (ppm)	24-hour	NA	0.04	0.003	0.002	0.002	0.009	0.007
SO ₂ (ppm)	Annual	NA	NA	0.001	0.000	0.001	0.002	0.002
PM ₁₀ (µg/m ³)	24-hour	150	50	NA	NA	NA	118	NA
PM ₁₀ (µg/m ³)	Annual	NA	20	22	18	17	25	NA
PM _{2.5} (µg/m ³)	24-hour	35	NA	28	34	27	17	20
PM _{2.5} (µg/m ³)	Annual	15	12		11	10	NA	9

Legend: µg/m³ = micrograms per cubic meter; CO = carbon monoxide; NA = Not Applicable; NO₂ = nitrogen dioxide; O₃ = ozone; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; ppm = parts per million; SO₂ = sulfur dioxide.

Notes: ¹ Exceedances of the standards are **bolded**. Data for calendar year 2008 inclusive to 30 September 2008.

Sources: Naval Facilities Engineering Service Center (2009), except PM_{2.5} data collected by the Mojave Desert Air Quality Management District at the Victorville station (MCAGCC 2014).

Table 3.3-4. Maximum Pollutant Concentrations Measured at the Joshua Tree National Monument Monitoring Station

Pollutant	Averaging Period	National Standard	State Standard	Highest Monitored Concentration ¹ 2012	Highest Monitored Concentration ¹ 2013	Highest Monitored Concentration ¹ 2014	Highest Monitored Concentration ¹ 2015	Highest Monitored Concentration ¹ 2016
O ₃ (ppm)	1-hour	NA	0.09	0.109	0.103	0.114	0.104	NA
O ₃ (ppm)	8-hour	0.075	0.07	0.082	0.086	0.085	0.094	0.082²

Legend: NA = Not Applicable; O₃ = ozone; ppm = parts per million.

Notes: ¹ Exceedances of the standards are **bolded**.

² Data for calendar year 2016 is from data collected from April to July 2016.

Sources: CARB 2016d; National Park Service 2016.

3.4 CULTURAL RESOURCES

3.4.1 Definition of Resource

Cultural resources include buildings, structures, sites, districts, and objects eligible for or included in the National Register of Historic Places (NRHP), human remains and cultural items as defined under NAGPRA, Indian sacred sites, and archaeological artifact collections (Secretary of the Navy Instruction 4000.35A, *Department of the Navy Cultural Resources Program*; Marine Corps Order P5090.2A, *Environmental Compliance and Protection Manual [26 August 2013]* Chapter 8 “Cultural Resource Management”). Cultural resources can be divided into three major categories: archaeological resources, architectural properties, and traditional cultural properties (National Park Service 2000).

Archaeological resources are material remains of past human life that are capable of contributing to scientific or humanistic understanding of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques. Archaeological resources can include, but are not limited to, village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, rock art, rock features, and burials.

Architectural properties include real properties such as sites, buildings, structures, works of engineering, industrial facilities, fortifications, and districts.

Traditional cultural properties are tangible places or objects that are important in maintaining the cultural identity of a community or group and can include archaeological sites, buildings, neighborhoods, prominent topographic features/landscapes, habitats, plants, animals, and minerals.

In general, specific locations of archaeological sites and traditional cultural properties are not revealed to the public because of the concern of vandalism or cultural sensitivity. Therefore, figures with specific locations of archaeological sites are not presented in this chapter.

The region of influence for cultural resources impacts related to the proposed action includes the landscape within which tortoises would be translocated, as well as areas subject to fencing or signage installation and helicopter landing areas located on both the Combat Center and on lands managed by the BLM (see Figures 2.1-1, 2.2-3, 2.2-4, 2.3-1, and 2.3-2). Under the NHPA, the region of influence is called the Area of Potential Effects (APE). The formal definition of an APE is found in 36 CFR 800.16(d), and is considered to be “the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties.”

3.4.2 Regulatory Framework

The primary framework used to identify and evaluate impacts to cultural resources is typically Section 106 of the NHPA, which covers those cultural resources that are historic properties. A historic property is defined as “any prehistoric or historic district, site, building, structure or object included in or eligible for inclusion in, the National Register of Historic Places” (54 USC 300308). The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material workmanship, feeling and association.

Section 106 of the NHPA requires that all federal agencies take into account the effects of their undertakings on historic properties. In addition, several other federal laws and regulations have been established to manage cultural resources, including the Archeological and Historic Resources

Preservation Act (1974), the Archaeological Resources Protection Act (1979), and NAGPRA (1990). These laws preserve historical and archaeological data, protect archaeological resources on public lands, and ensure consultation with Native American Tribes when human remains or cultural items are found.

The Programmatic Agreement Among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NCSHPO), Regarding the Manner in Which BLM Will Meet its Responsibilities Under the National Historic Preservation Act (NHPA), established guidelines by which the BLM will satisfy its requirements under NHPA. Under the NHPA, the Advisory Council on Historic Preservation (ACHP) has an advisory-consultative role in the BLM management process when a proposed project may have an effect on nationally significant cultural properties or when a project involves interstate and/or interagency coordination. A California State Protocol (signed in February 2014 to replace all previous agreements) between the California BLM and the California SHPO outlines the manner in which the two agencies will interact and cooperate under the NHPA. The California State Protocol legally replaces 36 CFR Part 800 as the procedural basis for the BLM to meet its responsibilities under Sections 106, 110(f), and 111(a) of the NHPA.

Coordination with federally recognized Native American tribes must occur in accordance with the American Indian Religious Freedom Act (1978); EO 13007 *Indian Sacred Sites*; and EO 13175 *Consultation and Coordination with Indian Tribal Governments*, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. This policy requires an assessment through consultation of the effect of proposed federal actions that could significantly affect tribal resources, tribal rights, and Indian lands before decisions are made by the respective services. The BLM's Manual 8120, *Tribal Consultation under Cultural Resource Authorities* (2004), outlines the methods for consultation and coordination on public lands administered by the BLM. This provides (1) that federally recognized tribal governments and Native American individuals, whose traditional uses of public land might be affected by a proposed BLM action, would have sufficient opportunity to contribute to the decision, and (2) that the decision maker would give tribal concerns proper consideration (BLM 2004). Department of Defense Instruction 4710.02 provides additional guidance for all Department of Defense agencies on consultation with tribes.

Marine Corps Order P5090.2A, Chapter 8, *Cultural Resources Management*, provides cultural resources policy (including consultation) for the Marine Corps. The 2012-2016 Integrated Cultural Resources Management Plan (ICRMP) for the Combat Center provides a framework of cultural resource management and for government-to-government consultation. The Combat Center cultural resources program coordinates with the SHPO, the tribes, and other interested parties by submitting an annual Historic Preservation Compliance Report, as prescribed by the ICRMP. The cultural resources program has been recognized for outstanding cultural resource stewardship over the last two decades (MAGTF Training Command 2011b).

3.4.3 Scope of Analysis

Known cultural resources present in the region of influence or APE for the proposed action include archaeological sites and objects. No historic buildings or districts have been identified. In 2016, the Colorado River Indian Tribes notified the BLM that they consider the desert tortoise a part of the tribes' cultural and spiritual landscape and noted that translocation of the desert tortoise would "fundamentally change the culturally sensitive nature of the landscape by removing the sacred fauna that have inhabited these lands since the time of the Tribe's Mohave ancestors." (Patch 2016). While the desert tortoise would not meet the definition of a historic property under Section 106 of the NHPA, the potential impacts

to the tribes' cultural and spiritual landscape as a result of translocating desert tortoise can be evaluated under NEPA.

3.4.4 Existing Conditions

3.4.4.1 Regional Cultural Context

Archaeological research on the prehistory of the Mojave Desert has been conducted for roughly a century, with particular attention paid to chronology and human-environment adaptations. Refer to Appendix J of the 2012 Final EIS for a detailed summary.

Native Americans occupied the Twentynine Palms region for at least the past 12,000 years. The lands currently occupied by the Combat Center appear to have been variously used and occupied by the Serrano, Chemehuevi, and Mojave Indians as well as others during the prehistoric and early historic periods. In the mid-1800s, the Chemehuevi and the Serrano were documented at the Oasis of Mara in Twentynine Palms. Documentation indicates that Native Americans occupied reservation land near the Oasis of Mara until the early 1910s when they were moved to the Indian Reservation at Morongo.

Prehistoric sites in the Twentynine Palms region are generally located along streams, lakeshores (both extinct and modern), and adjacent to springs. Accumulations of alluvium may have buried complex prehistoric habitation sites, and intact cultural deposits may be present. Beginning with the 1849 California Gold Rush, and lasting until World War II, the Twentynine Palms region first attracted miners and then homesteaders that made their way to the desert community. Gold mining was later suspended by a presidential executive order in 1942 that declared gold mining a nonessential industry to the war effort. The gold mining suspension lasted until the end of World War II, but the mining of copper, iron, manganese, tungsten, lead, and zinc intensified. The military presence in the Twentynine Palms area began in 1941 with the establishment of Camp Condor, a U.S. Army glider-training base. The Combat Center was officially commissioned as a Marine Corps installation in 1957, and became known as the MCAGCC in 1979 (MAGTF Training Command 2011b).

Archaeological resources on the Combat Center have been studied since the late 1970s. Most of the studies completed in the 1980s and early 1990s were project-specific cultural resources surveys, with basic inventory and evaluation projects taking precedence since that time. As of the publication of the 2012 Final EIS, approximately 246,164 acres (99,619 ha) or 45% of Combat Center lands had been inventoried for cultural resources. As a result of completed inventories, some 1,895 archaeological sites have been located and recorded (72 historic, 14 "multicomponent," and the rest prehistoric), and 528 sites have been evaluated for listing in the NRHP. The Combat Center has site protection measures in place to avoid impacts to NRHP-eligible prehistoric and historic sites. Cultural resources and surveyed areas within (or directly adjacent to) the recipient areas under the No-Action Alternative, and the recipient and control sites under Alternatives 1 and 2 are described in Tables 3.4-1 and 3.4-2, respectively.

Federally recognized Native American tribes who have cultural affinity with the land on which the Combat Center lies include the Agua Caliente Band of Cahuilla Indians, Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Morongo Band of Mission Indians, San Manuel Band of Mission Indians, and Twenty-Nine Palms Band of Mission Indians. MAGTF Training Command consults on a government-to-government basis with these tribes (MAGTF Training Command 2011b).

Table 3.4-1. Cultural Resources within Recipient Areas (No-Action Alternative)

Area	Total Size (Acres)	Area Surveyed for Cultural Resources (Acres)	Survey Results
Recipient Areas			
Ord-Rodman	23,475	0	NA
Sunshine Peak	3,707	2,948	1 eligible site 1 ineligible site
WEA	12,015	3,475 (in western WEA)	0 sites
		3,502 (in northern WEA)	1 eligible site 2 ineligible sites
SEA	2,935	3,111	0 sites
Alternate Recipient Areas			
Bullion	2,417	1,142	0 sites
Emerson Lake	2,417	2,323	6 eligible sites 38 ineligible sites

Legend: NA = Not Applicable; SEA = Southern Expansion Area; WEA = Western Expansion Area.

Table 3.4-2. Cultural Resources within Recipient and Control Sites (Alternative 1 and Alternative 2)

Site	Total Size (Acres)	Area Surveyed for Cultural Resources (Acres)	Survey Results
Recipient Sites			
Lucerne-Ord	37,619	0	NA
Rodman-Sunshine Peak North	26,078	10,804	4 eligible sites 1 ineligible site
Siberia	21,612	0	NA
Broadwell	10,121	0	NA
Cleghorn	2,321	2,004	0 sites
Bullion (Alt 1)	13,073	1,955	0 sites
Control Sites			
Rodman-Sunshine Peak South	13,563	3,531	1 eligible site 2 ineligible sites
Daggett	6,183	0	NA
Ludlow	3,054	0	NA
Calico	1,994	0	NA
Cleghorn Control	1,964	1,969	0 sites
Bullion Control (Alt 1)	2,010	0	NA
Bullion Control (Alt 2)	2,136	1,592	0 sites

Legend: NA = Not Applicable.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

This chapter describes potential environmental consequences associated with implementation of the No-Action Alternative and each action alternative. CEQ regulations implementing NEPA state that the environmental consequences discussion shall include any direct and indirect impacts and an evaluation of significance. Consistent with the discussion of the affected environment (Chapter 3), this chapter has been divided into the four resource areas described in detail in Chapter 3 to provide a comparative framework for evaluating the impacts of the No-Action Alternative and each action alternative on individual resources. Each resource area identifies the potential impacts that could be expected under each alternative. In addition to the SCMs identified in Chapter 2 of this SEIS, appropriate mitigation measures have been identified to further reduce impacts.

4.1 BIOLOGICAL RESOURCES

4.1.1 Approach to Analysis

The biological resources impact analysis considers potential impacts to vegetation, wildlife, and protected and special status species from all aspects of the proposed action and alternatives, including impacts associated with translocation, fence construction, and other research, as described in Chapter 2.

As discussed in Section 1.2 and Section 1.3 of this SEIS, impacts associated with establishing a large-scale training range facility at the Combat Center that would accommodate sustained, combined-arms, live-fire, and maneuver training for all elements of a MEB are analyzed in the 2012 Final EIS and are incorporated by reference in this SEIS. As such, impacts to vegetation, wildlife, and special status species associated with MEB building block training activities, as well as the removal of desert tortoises (a keystone species) from the medium- and high-impact training areas, were previously analyzed in the 2012 Final EIS (refer to Section 4.10, *Biological Resources*, of the 2012 Final EIS) and will not be revisited in this SEIS. Furthermore, as described in Section 3.1.3 of this SEIS, *Scope of Analysis*, only the biological resources potentially subject to impacts from the proposed desert tortoise translocation are considered in detail below. As such, the impact analysis in this SEIS focuses on the impacts to vegetation and the desert tortoise, with the greatest emphasis on impacts to the desert tortoise. For example, the desert tortoise impact analysis considers potential impacts associated with:

- Desert tortoise translocation and monitoring activities, which would require tortoises to establish new home ranges that, in turn, would cause a variety of adverse physical and social effects to tortoises.
- Effects to population viability at recipient sites.
- Fence construction.
- Desert tortoise handling.
- Effects to connectivity of the region.
- Genetic considerations.

Section 4.1.1.1 provides additional detail on the approach to the vegetation impact analysis. To provide context for this analysis, Section 4.1.1.2 describes existing USFWS translocation guidance utilized to

develop the proposed action and alternatives, and Section 4.1.1.3 discusses previous translocation efforts and related research.

4.1.1.1 Vegetation

Impacts to vegetation would result from the construction of fences as well as vehicle maintenance roads along the length of the fences (on Combat Center property). The use of different types of fence and specific fencing layouts vary under each alternative (see Chapter 2). Vehicles carrying fence materials to the site would use existing range roads and a new maintenance access road constructed as part of this project. Construction of the new maintenance road would disturb surface soil and vegetation along the length of the fence. The total combined impact width of the trench for fence installation and the maintenance road would be approximately 19 ft (6 m). Approximate lengths and locations of the proposed fences are described in Chapter 2.

Impacts to native vegetation are analyzed for each alternative in Sections 4.1.2.1, 4.1.3.1, and 4.1.4.1 (No-Action Alternative, Alternative 1, and Alternative 2), respectively, and would be offset by the implementation of SCMs discussed in Section 2.6.

4.1.1.2 USFWS Translocation Guidance

In November 2011, the USFWS published draft guidance for the development of project-specific translocation plans for activities that may impact desert tortoises when avoidance of these impacts is not feasible and adverse effects of the proposed action need to be minimized (USFWS 2010b). Fundamental direction within the document states, “If translocation can be justified as the most appropriate course of action, this document should be used as an outline that, when combined with project-specific input from the USFWS and other permitting agencies, will facilitate the completion of a translocation plan.” Consistent with this fundamental direction, and as described in Chapter 2, the Combat Center utilized the 2011 draft guidance in conjunction with USFWS consultation to develop the No-Action Alternative (i.e., the 2011 GTP) and Alternative 1 (i.e., the March 2016 Translocation Plan). Topics included in the extensive 2011 draft guidance include:

1. Determining the need for the translocation of desert tortoises.
2. Estimating the number of tortoises that would be affected at the project site.
3. Identifying potential recipient and control sites.
4. Estimating the desert tortoise abundance at agreed-upon potential recipient and control sites.
5. Developing the translocation plan and associated effectiveness-monitoring program.
6. Confirming desert tortoise abundance at the potential recipient and control sites as *in situ* health-assessment sampling is conducted and transmitters are attached.
7. Determining if desert tortoises on the project site would be held *in-* or *ex situ*.
8. Constructing project fencing, conducting protocol clearance surveys of the project site, and performing health assessments.
9. Translocating desert tortoises following USFWS acceptance of the translocation-review package.
10. Implementing post-translocation monitoring (30-year minimum) and using adaptive management to evaluate the effectiveness of translocation as a take-minimization measure.
11. Compiling and synthesizing data throughout the duration of the translocation and monitoring.

In early 2016, the USFWS provided updated draft guidance (USFWS 2016a). This guidance, in conjunction with ongoing consultation with the USFWS, contributed to the development of Alternative 2 (i.e., the June 2016 Translocation Plan).

4.1.1.3 Previous Translocation Efforts and Related Research

Translocation of wild desert tortoises, and release of captive desert tortoises, has been performed and studied since 1997. As such, nearly two decades of data have been created by the scientific community on the subject. These studies have found no significant effect of translocation compared with resident or control populations on survivorship or mortality (Field et al. 2007; Esque et al. 2010; Nussear et al. 2012; Brand et al. 2016), stress (Drake et al. 2012), or reproductive output (Nussear et al. 2012).

The following discussion summarizes the most relevant data, including: translocations and headstarting at the Combat Center; translocations at other locations, including the Fort Irwin National Training Center, the Large Scale Translocation Site, the Ivanpah Solar Electric Generating System (ISEGS), and at other sites in southwest Nevada; and other relevant research.

Translocations and Headstarting at the Combat Center

In 2006, the Combat Center translocated 17 adult tortoises to support construction of Range 220. Of the 17 animals, there was only one mortality during the 3 years of post-translocation monitoring, which equates to 98% annual survivorship. Additionally, no impacts were detected on resident tortoises monitored in the recipient population.

In conjunction with the USFWS and other academic researchers, the Combat Center also operates a desert tortoise headstart facility, the TRACRS, where desert tortoises are hatched and reared until they are large enough to survive on their own. In the wild, hatchling mortality is extremely high due to the harsh physical environment and predation by common ravens and coyotes; by protecting nests, hatchlings, and juveniles, the expectation is that more offspring will become fully-functional adults and will in turn produce offspring to help the population recover. Within the first 9 years of the program's operation, the Combat Center has successfully raised 475 juveniles and maintained an annual survivorship ranging from approximately 85-96% per year (compared to approximately 40% or less in the wild; Bjurlin and Bissonette 2004). The next major phase of the program, releasing and monitoring juveniles of sufficient size, commenced in September 2015 with the release, during favorable environmental conditions, of the first cohort of 35 nine-year-old juveniles that ranged in size from 4 to 5 inches (10 to 13 cm).

Translocations at the Fort Irwin National Training Center

Analysis of 2008 Translocation of 357 Desert Tortoises by Esque et al. (2010)

In 2005, the Fort Irwin National Training Center implemented a multi-year translocation project that involved collecting baseline, pre-translocation monitoring data for tortoises at the translocation, recipient, and control sites. Esque et al. (2010) analyzed post-translocation monitoring data for 357 tortoises translocated between March 27 and April 18, 2008. High predation on translocated, resident, and control tortoises was observed after translocation occurred.²

² Within the first year of the translocation project, 28 (19%) of the 149 control tortoises, 29 (21%) of the 140 resident tortoises, and 89 (25%) of 357 translocated tortoises were found dead. Esque et al (2010) believe the vast majority of these tortoises were killed by predators based on (1) the detailed research histories of each tortoise, (2) the frequency of monitoring, (3) the fact that the tortoises were overtly healthy when last observed, and (4) direct evidence of predation on the carcasses.

In a retrospective analysis of the data from the 2008 Fort Irwin translocation, Esque et al. (2010) tested several variables and determined that the size of the human population, the surface roughness of the area, and the size and sex of the animal explained the mortality the best, and that treatment group (i.e., translocated, resident, control) was not a statistically significant variable in the models that provided the best explanation of the data. They also report that high mortality rates were not limited to the Fort Irwin National Training Center (mortality as high as 43% occurred throughout the listed range of the desert tortoise in 2008) and hypothesized that low population of typical prey species (e.g., black-tailed jackrabbits [*Lepus californicus*]) due to severe drought caused predators (e.g., coyote [*Canis latrans*]) to switch to less-preferred prey species (e.g., desert tortoises). Indeed, Esque et al. (2010) conclude:

Other hypothesized mechanisms for heightened predation levels include increased movements of tortoises that were translocated (Nussear 2004, Field et al. 2007), potential unavailability or unfamiliarity with locations of cover sites, food and water, and the attraction of predators to areas with increased tortoise densities and increased human activity. However, translocated, control, and resident animals did not differ statistically in mortality rates from one another. This eliminated not only the translocation itself as a factor in mortality, but also the possible influence of increased densities, as the control tortoises were maintained at natural densities while both resident and translocated tortoises being collocated necessarily increased density. Considering all these factors as well as analyses of animal size and sex, proximity to urban areas, surrounding human population density, road density, and regional predation patterns, we conclude that what we observed was a severe range-wide predation pulse that may reflect the status of the Mojave Desert in its entirety rather than being the result of a single management activity.

The coincidence of widespread and high predation rates with the translocation was unfortunate. However, there was no evidence that the translocation influenced the high predation rate at Fort Irwin National Training Center. Instead, data available to us indicate that the phenomenon was widespread across the desert.

The results reported by Esque et al. (2010) are also consistent with results of other studies discussed in Field et al. (2007), summarized below.

Analysis of 2009 and 2010 Translocation of 80 Desert Tortoises by Hinderle et al. (2015)

Hinderle et al. (2015) explored homing behavior, moving patterns, and other behavioral responses of desert tortoises to translocation. A total of 80 desert tortoises were studied in 2 phases (40 per phase) and were randomly assigned to one of three groups, as described below. All tortoises were in good condition upon the experiment's conclusion.

- Translocated tortoises were translocated 1 mile (2 km), 3 miles (5 km), or 5 miles (8 km) away from their capture location. No artificial burrow was provided for the translocated tortoises; instead, they were placed in the shade of a creosote shrub.
- Tortoises in the handling control were either handled at their burrow by researchers for less than one hour or were placed in a vehicle, transported, and handled for up to three hours. All handling control tortoises were returned to their initial capture site.
- Control group tortoises had a radio transmitter attached at least 6 months before the commencement of the experiment and were not handled otherwise. During the analysis, this group was combined with the handling control group as no difference in total distance traveled or net displacement occurred between the two control groups.

Movement behavior was analyzed using four metrics: (1) the ability of tortoises to find their way home, defined as any location within 500 m of their original capture location; (2) directionality (i.e., determining if the animal traveled towards their capture location, and how direct the path was); (3) the total distance traveled; and (4) net displacement (i.e., the straight-line distance between the tortoises' initial release point and the capture location on day 37).

A statistically significant number of tortoises (9 out of 47) navigated home among the 3 translocation groups, the vast majority (8 out of the 9) were in the 1 mile (2 km) distance group; 1 was on the 3 mile (5 km) distance group. One tortoise in the 5 mile (8 km) distance group came within 2,198 ft (670 m) of her capture site within 20 days of translocation. The time required to reach home ranged from 5–37 days for the 1 mile (2 km) distance group and was 34 days for the 3 mile (5 km) distance group. With respect to total distance moved, translocated tortoises moved more than control tortoises, and male tortoises moved more than female tortoises. In terms of net displacement, translocated tortoises were displaced greater distances than the control groups, but no difference was found between males and females.

In their discussion, Hinderle et al. (2015) recommends taking into account “population densities, disease status of both recipient and donor populations, present and future anthropogenic influences, predator densities, and habitat structure” when selecting desert tortoise translocation sites. Since 44% of the tortoises in the 1 mile (2 km) distance group successfully returned home, they recommend that translocated tortoises be translocated more than 1 mile (2 km) away from their collection site or an effective barrier fence must be constructed. Hinderle et al. (2015) acknowledge that homing tortoises that encounter and walk along the fence may increase their vulnerability to predation, mortality, or thermal stress. The authors also acknowledged that increasing translocation distance may increase total tortoise movement and net displacement, although this trend was not statistically significant given the relatively small sample size. If this trend is valid, translocating tortoises more than 3 mile (5 km) would increase total movement and net displacement and “could dramatically heighten vulnerability to predation, mortality, disease, and aggressive conspecific interactions, and may increase the likelihood of encountering an anthropogenic landscape, including fencelines, roads, or developed areas.” Regardless of translocation distance, translocated tortoises moved at least 1.5 times more overall than control groups, with some tortoises traveling over 6.25 miles (10 km) from the translocation site. This increased movement by translocated tortoises “may influence [their] ability to breed successfully, affect survivorship, or have physiological consequences.”

Hinderle et al. (2015) recommend that recipient sites be large enough to support a translocated population with large movement patterns and net displacement distances and that they be monitored more closely during the first weeks or months post-translocation.

Translocations at the Large Scale Translocation Site (LSTS)

Analysis of 1997 Translocation of 26 Adult and 2 Juvenile Desert Tortoises by Field et al. (2007)

Desert tortoises previously held at the Desert Tortoise Conservation Center (which has since been closed) received supplemental water daily throughout their active seasons. Field et al. (2007) tested the hypothesis that ending the supplementation of water in the fall before the spring release would increase initial success in translocation. Tortoises were randomly assigned to two groups: water-supplemented (which continued to receive water daily and immediately before release) and not-supplemented (which received no supplemental water, although they were given the opportunity to drink immediately before release). Tortoises were released into artificial burrows located at the Large Scale Translocation Site (southwest of Las Vegas in Nevada) near the end of spring during a drought year (1997) and monitored

for 2 years following translocation. No resident or control-group tortoises were studied, but results of this study were compared to studies of wild tortoises at other locations within California and Nevada.

Findings and conclusions from Field et al. (2007) that are relevant to the proposed action in this SEIS include the following:

- All but two tortoises moved away from the artificial burrows on the days of their release, in either a straight-line or a meandering fashion. Most of the movement away from the point of release occurred during the first 2 weeks and there was no tendency to travel towards the Desert Tortoise Conservation Center. The authors note, however, that other studies have shown that captive tortoises are less likely to attempt to return home when translocated, whereas wild tortoises are more likely to do so when translocated.
- Due to extensive movement during the first year, home range sizes could not be calculated. Home range sizes and distance moved from hibernacula during the second year were comparable to the home range sizes of wild tortoises from other studies.
- The two groups of tortoises continued to have similar fluctuations in body mass for the duration of the study and, when compared to wild tortoises in other studies, lost less body mass than would be expected.
- Six tortoises (21.4%) died, three (10.7%) were lost (unknown survival), and 19 survived to the first hibernation. No tortoises died during the second year of the study (1998 was an exceptionally wet year). Mortality rates between the two treatment groups were not significantly different. Tortoise deaths were as follows:
 - One adult male that had been supplemented with water; there was no evidence of predation. This tortoise showed possible signs of disease 1 week before its death.
 - Two non-supplemented adult females; one was never found in a burrow and travelled long distances within the first 21 days after release. The condition of the second tortoise was consistent with predation by bobcat (*Lynx rufus*) or mountain lion (*Puma concolor*).
 - Three water-supplemented adult female tortoises; two were found with possible signs of disease and were either preyed upon or scavenged. One of these two was only found using a single burrow up to its death 57 days after release. The third tortoise was found only using one burrow until 91 days after release, when it was found dead in a second burrow. It appeared that this tortoise remained in the burrow during a rainstorm and did not dig itself out when the burrow collapsed.
- Problems associated with overheating translocated tortoises would likely be minimized by releasing them in early- to mid-spring instead of late-spring or summer and ensuring that they have several hours to move about before ambient temperatures become problematic.
- The movement patterns of a second cohort of tortoises that were translocated to the site in 1998 were similar to those during their first year as the tortoises that were translocated in 1997. As such, it is expected that high rates of movement during the first year, and the reduction in movement in the second year, is due to lack of familiarity with the area in the first year, followed by familiarity in the second year, and not the break of the drought that occurred in spring 1998.
- Data from other studies suggest that both resident and translocated tortoises at the translocation site were negatively impacted by drought conditions in 1997. Related, the cohort of tortoises

released in 1998 had a 2.5% (1 of 40) mortality rate. This further suggests that drought, and not the translocation, strongly influenced mortality rates.

- While translocations during dry years may be acceptable (since drought conditions likely affect resident and translocated tortoise mortality rates similarly), it may be beneficial to release tortoises with unknown histories (e.g., unknown access to sufficient food and water in years before translocation) in non-drought years.

In their conclusion, Field et al. (2007) write:

Regardless of water supplementation regimen, initial success in our translocation demonstrates high potential for longer-term successes. We strongly suggest that translocation be considered a valid tool available for conservation of the Desert Tortoise.... If we are able to effectively abate the myriad of threats that lessen the likelihood of this species' persistence, translocation of tortoises to appropriate areas will be essential to bolster decimated populations toward a sustainable existence.

Review of Translocations to the Large Scale Translocation Site from 1997-2014 by Allison et al. (2016)

Surveys estimated the adult tortoise population at the Large Scale Translocation Site to be 1,449 in 1996. In the following 18 years (from 1997 through 2014), 9,110 tortoises (including 4,400 adults) were translocated from the Desert Tortoise Conservation Center to the Large Scale Translocation Site. Despite continued releases, there were only approximately 1,000 adult tortoises found between 2001 and 2007. Since 2008, estimates of adult tortoise abundance have been less than 550, and two surveys in 2015 indicated tortoise abundance at the Site of approximately 320 adults (Allison et al. 2016). While it is clear that tortoises at the Site are declining, it should be noted that there were a large number of captive tortoises in the translocated population, and there were extreme changes in survey methodology during this time. These two factors make it unclear if results should be compared across years or between different translocation efforts. This decline reflects tortoise decline throughout most of the desert tortoise's range, as discussed in Section 3.1.4.3.

Translocations Associated with the Ivanpah Solar Electric Generating System

Analysis of 2012 Translocation of 54 Adult Desert Tortoises by Farnsworth et al. (2015)

The ISEGS in southern California is presently the largest solar thermal power plant in the world, located in the Ivanpah Valley, approximately 100 miles (160 km) northeast of the Combat Center. Farnsworth et al. (2015) monitored 54 translocated, 118 resident, and 136 control tortoises to examine the effects of very short (i.e., less than 500 m) translocations. Control tortoises were split among two sites (105 at the west site, 31 at the east site). Translocated tortoises were collected in October 2010, held in quarantine pens to ensure none of the tortoises exhibited signs of disease, and released in April 2012 adjacent to the ISEGS project area from where they were collected. Each translocated tortoise was tracked before collection. The authors did not report how tortoises were released (e.g., whether they were placed under a shrub or placed into an artificial or inactive burrow).

During the first active season post-translocation, home range size was greater and space-use intensity was lower for translocated tortoises than for resident and control groups. These patterns were not present in the second season. In both years, there was no difference in home range size or space-use intensity between control and resident groups. These results suggest that tortoises translocated only short distances (possibly still within a portion of their original home range) may require only one or two active seasons to reestablish a burrow network after translocation. A previous study (Nussear et al. 2012 [described

below]) indicated that translocation of desert tortoises over larger distances (and entirely out of their home range) would require up to 3 years for tortoises to behave statistically similar to a resident group.

Farnsworth et al. (2015) note that “minimizing the time a tortoise spends questing for a new burrow network is crucial, particularly if the translocation takes place during, or immediately preceding, periods of drought” and that short-distance translocations may allow for such minimization. However, they also note that short-distance translocations “may result in a stronger homing instinct resulting in greater exposure to potential threats (e.g., by ‘fence pacing’ when prevented from returning to previous portions of a home range).” In this study, tortoises were found significantly closer to the project during the first year after translocations than in the second. In the second year, these tortoises that remained close to the project boundary did not appear to attempt to return to their previous home range. The authors conclude that “because so few studies have examined the effects of translocation on tortoise movement patterns over multiple years, it remains unclear if short-distance translocation reduces the length of time individuals are exposed to various stressors.”

Analysis of 2012 Translocation of 43 Adult and 12 Immature Desert Tortoises by Brand et al. (2016)

Unlike Farnsworth et al. (2015), which examined movement patterns of tortoises post-translocation (as described above), Brand et al. (2016) evaluated (1) whether maximum tortoise temperatures, and duration above threshold temperatures, were higher in translocated than resident or control groups; (2) how long this effect lasted post-translocation; (3) whether there were differences by groups within age and gender classes; and (4) the influence of translocation on tortoise condition, growth, and mortality. Brand et al. (2016) employed similar methods, and used many of the same tortoises, as described above by Farnsworth et al. (2015). In total, Brand et al. (2016) monitored 55 translocated tortoises, 73 resident tortoises, and 87 control tortoises; of these, 215 were randomly fitted with temperature loggers. Upon release, translocated tortoises were placed under shrubs; no artificial burrows were provided. Tortoises were tracked weekly during the active season for 3 years.

Study results suggested that estimates of mortality were slightly higher, but not significantly different, for translocated compared with resident and control tortoises in the 3 years post-translocation.

Brand et al. (2016) report that translocated tortoises had higher maximum daily temperatures, and that body temperatures remained above key thresholds for greater durations than for resident and control tortoises, especially during the first month after translocation. Consistent with findings by Hinderle et al. (2015), described above, the authors report that several tortoises were observed pacing project fencing, particularly during the first several weeks of translocation. Effects on temperature, however, “were reduced in the second month and were largely gone by months 3–5 and during the entire second and third years post-translocation.” The authors note that “the relatively short-term thermal effects may have been ameliorated, in part, by tortoise familiarity with cover site locations or because tortoises were released with time to find or construct burrows during cooler environmental temperatures in spring.”

For short-distance translocations, short-term thermal effects were observed primarily in the first month but no differences in condition, growth, or mortality for translocated tortoises. Study results also showed that translocated males had higher temperatures than females during the first year, perhaps because of their larger home ranges. Perhaps surprisingly, resident immature tortoises were determined to have higher body temperatures than translocated or control immature tortoises. The authors note, however, that the mechanism that causes translocated tortoises to have this potential effect on resident immature tortoises is unknown and that the sample size that led to this finding is small.

Despite short-term temperature effects, there were no apparent negative effects of translocation on body condition, growth, or mortality following translocation. This result, however, may be due in part to the supplemented water provided to the tortoises while in the holding pens before translocation.

The authors conclude their discussion by stating:

There has been skepticism about impacts of mitigation-driven translocations on sensitive species in desert regions (Germano et al. 2015; Sullivan et al. 2015), and several studies have evaluated desert tortoises translocated following exurban or military development. These studies have found no effect of translocation compared with resident or control populations on survivorship or mortality (Esque et al. 2010; Field et al. 2007; Nussear et al. 2012), stress (Drake et al. 2012), or reproductive output (Nussear et al. 2012). Increased movement has been the largest effect observed in both long-distance (Field et al. 2007; Nussear et al. 2012) and short-distance (Farnsworth et al. 2015; Hinderle et al. 2015) translocations. For short-distance translocations, we observed short-term thermal effects primarily in the first month but no differences in condition, growth or mortality for translocated tortoises. Several authors have suggested translocation of desert tortoises may serve as a conservation or mitigation tool (Drake et al. 2012; Field et al. 2007; Nussear et al. 2012), and given the lack of group effects on condition, growth, or mortality, our study supports these previous findings.

Translocations at Other Sites in Southwest Nevada

Analysis of 2012 Translocation of 60 Juvenile Desert Tortoises by Hall et al. (2016)

Hall et al. (2016) presented the results of a study on factors influencing survival of translocated desert tortoises at the Desert Tortoise Council's Annual Symposium in February 2016. In September 2012, 60 captive juvenile desert tortoises were translocated from the Desert Tortoise Conservation Center in Las Vegas to the Nevada National Security Site (formerly the Nevada Test Site). More than 3 years post-release, 27 (47%) of the juveniles remained alive, an annual average survival rate of 77%. The majority (31) of the carcasses showed signs of dog/coyote predation or scavenging, 3 deaths were attributed to exposure to extreme weather conditions, and 4 died of unknown causes. Mortality was highest during fall, although carcasses showing evidence of predation were found throughout the year. In their presentation abstract, the authors did not report (1) whether translocations occurred after the hot season ended, (2) the quality of the habitat at the recipient site, (3) whether control or resident tortoises were monitored, or (4) how the tortoises were released.

Analysis of 2014 and 2015 Translocation of 80 Juvenile Desert Tortoises by Nafus et al. (2016)

Nafus et al. (2016) released a total of 80 juvenile desert tortoises from the Desert Tortoise Conservation Center among four sites in southwest Nevada in September 2014 and April 2015. The goal of the study was to understand how three habitat characteristics (rodent burrows, substrate texture [prevalence and size of rocks], and washes [ephemeral river beds]) affected the juvenile translocated tortoises. Each tortoise was released by placing its head into a rodent burrow. Tortoises were tracked weekly during the active season and bi-weekly during hibernation. Neither control nor resident tortoises were monitored.

Within 2 weeks, 46 tortoises settled into a movement pattern that suggested a home range, and the remainder had settled by 2 months, with the exception of nine tortoises that died before settling. Washes, which are used as foraging corridors and are selected by juveniles, as well as larger rocks, which provide for camouflage, were found to reduce dispersal distance. Results did not indicate that burrow abundance affected dispersal, although the authors note that "the presence of even one rodent burrow at release may

have been enough to reduce dispersal” and that the sampling method may not have “accurately measured refuge availability or the perception of availability.” The authors suggest that “the relatively high site fidelity makes juveniles appealing for conservation translocations, if rates of survival and recruitment into the adult population can be improved” and that “careful selection of local microhabitat at the release point has the potential to increase survival above what is typical for the average wild juvenile.”

Other Relevant Research

The research discussed above presents detailed summaries of the most relevant research pertaining to desert tortoise translocation and highlight what is known about potential effects to both translocated and resident tortoises.

Goodwin et al. (2002) conducted a captive experiment to test whether increased density of tortoise results in higher mortality, lower reproductive success, and other measures. Densities ranged from 337 to 3,204 tortoises/km². This experiment was done with the explicit intention of determining if additional tortoises may be translocated to a site without deleterious impacts to recipient animals. The results showed very few statistically significant results but the researchers noted that 3 years may not have been enough time to document effects.

The following are summaries of other relevant research related to desert tortoise translocations, as annotated by Berry et al. (2016):

Bulova (1994) suggested that success of relocations may be limited by availability of suitable shelters for introduced tortoises; also that provision of burrows may facilitate adjustment of relocated tortoises to a new area.

Peterson (1994) noted that high mortality in populations of desert tortoises at both the Desert Tortoise Natural Area in the west Mojave Desert and Ivanpah Valley in the eastern Mojave Desert, CA, were attributable to effects of drought. The effect of drought occurred indirectly in the western Mojave through functional responses of predators to a diminished prey base [and disease], and directly in the eastern Mojave through starvation and dehydration. Episodic, drought-related high mortality has probably occurred repeatedly in the evolutionary history of desert tortoise, but human exploitation of the desert may exacerbate natural stresses, and recovery of populations is likely to be slow.

Rostal and others (1994) in a study of captive and penned hatchling, juvenile, and immature tortoises at the Desert Tortoise Conservation Center in Las Vegas, NV, noted that prolonged handling and manipulation of tortoises prior to or during blood sampling (i.e., >10 minutes) may influence plasma testosterone levels. Tracy et al. (2006) hypothesized that increased stress and testosterone levels resulting from handling may decrease immunity to disease.

Andersen and others (2000) said that sites with loamy soils allowing tortoises to dig burrows, with sufficient areas with southern exposure likely to improve thermal balance, and with adequate plant cover should be selected when considering translocation sites.

Nagy and others (2002) reported that condition indices of free-ranging desert tortoises in the eastern Mojave Desert, CA, peaked in May and progressively lessened through summer, reaching their lowest Condition Index (CI) values in August or October. This pattern was expected solely from a nutritional perspective, because spring was when green forbs were available; as summer progressed, temperature and drought conditions

increased, and food plants dried and withered. In contrast, hatchling tortoises in captive conditions at the Fort Irwin National Training Center, CA, had very low condition indices (CI; 0.401 grams per cubic centimeter [g/cm^3]), averaging less than 65% of prime CI. In contrast, two free-ranging hatchlings measured at Goffs in the eastern Mojave Desert had CIs of 0.645 and 0.733 g/cm^3 (101 and 114% of prime CI).

Longshore and others (2003) reported that substantially and significantly lower annual survival of tortoises at one of two sites corresponded to limited rainfall and failure of annual plant growth. The limited rainfall and lack of annual plants appeared to cause mortality of almost one-third of adult tortoises likely due to starvation or dehydration within the Lake Mead National Recreation Area, NV.

Murphy and others (2007) identified restorative actions for populations that have become disjunct or mixed as a result of anthropogenic activities, e.g., remove translocated tortoises from critical habitat, genetically test and remove tortoises from areas adjacent to frequently used recreation sites where visitors often release tortoises illegally, or conduct augmentations or translocations in populations that have dropped below viable levels. However, using tortoises within a well-defined recovery unit or local geographic area for head-starting or augmentation was far better than translocating tortoises between Recovery Units.

Drake and others (2012) evaluated a population of desert tortoises in three treatment groups (resident, translocated, and control) in the north-central Mojave Desert, CA, for stress responses using plasma total corticosterone. Corticosterone was higher for males than females and values for both varied monthly throughout the activity season and among years. Blood samples collected from adult tortoises for 1 year and prior to and 2 years after translocation showed that year and sex (but not translocation) were strong predictors of corticosterone levels.

Nussear and others (2012) reported that translocated tortoises moved greater distances in their first year compared to residents, but decreased their movement over time for up to 2–3 years after which they showed increasing site fidelity indicating establishment of home ranges. For tortoises translocated to atypical habitat (Great Basin scrub at the Shivwits and Pakoon sites), movement distances were 3–4 times those observed at sites with typical tortoise habitat (Mojave Desert scrub). Two seasons elapsed before their movements were similar to Nevada residents and their movements generally took the animals to more typical habitat types.

Nussear and others (2012) [also] found that annual survivorship did not differ between resident and captive translocated tortoises and averaged 0.94 over all seasons among five sites in UT and NV. The authors also found no relationship between mortality of translocated tortoises and possible contributing factors of translocation group, sex, day or month of the year released, or the amount of time spent in captivity prior to translocation (ranging from 15 to 2,292 days).

In the first year after translocation, mean reproductive effort for previously captive translocated tortoises was an average of one egg less than resident tortoises but the number of eggs between translocated and resident tortoises did not differ in the second or third years post-translocation. The authors emphasized three issues to be considered when translocating tortoises:

1. Consider the potential for long distance movements and evaluate the site for potentially risky features, such as roads with heavy traffic, unless the boundaries of unsuitable features are fenced.
2. Release tortoises in spring or fall and avoid summer months because animals may fail to find adequate shelter from high temperatures.
3. Consider prioritizing adult female tortoises as candidates for translocations given their importance for population demographics.

Aiello and others (2014) discussed common features observed following translocations that can affect transmission of infectious diseases. The authors used preliminary data from the translocation of tortoises to three sites from Fort Irwin in 2008 to illustrate potential consequences [such as increased disease outbreak risk due to increased contact frequency].

Averill-Murray and Hagerty (2014) reported that tortoise populations within 200 km of each other are genetically correlated. Therefore, based on their results and previously published qualitative risk assessments, translocating tortoises from their original site to a recipient site <200 km away has low probability of causing outbreeding depression.

Jacobson and others (2014), in a review of research on *Mycoplasma* in tortoises, concluded that translocation as a management tool should include the health status of translocated tortoises and those at the recipient site, as well as long-term monitoring of effects on translocated and recipient populations.

Agha and others (2015), drawing on data collected between 1997 and 2014, studied effects of research activities and winter precipitation on voiding of *Gopherus agassizii* at the Mesa study area in the Colorado Desert, CA. The authors reported that 42 tortoises voided on 8.2% occasions (1,008 total capture events). The models indicated that increases in handling time led to significantly higher probabilities of voiding for juveniles, females, and males. Increases in precipitation also resulted in significant higher probabilities of voiding for juveniles and females, but not for males. Capture frequency was negatively correlated with voiding occurrence. Models showed negligible effect for voiding behavior and sex on survivorship.

Germano and others (2015) questioned whether mitigation-driven translocations are moving in the right direction (in general, using the gopher and desert tortoises as two examples, as well as other species). The authors noted that mitigation-driven translocations outnumber and receive more funding than science-based conservation translocations, with conservation benefits of the former unclear. Outcomes may be less successful in economically motivated mitigation translocations than releases designed to serve biological needs of species. Translocation as a regulatory tool may be ill-suited for biologically mitigating environmental damage caused by development. Evidence suggests that many mitigation-driven translocations fail, although the application of scientific principles and best practices would probably improve success rates.

Mack and others (2015), drawing on studies of the thermal environment of tortoise cover sites in the Soda Mountains, CA, noted that:

1. Cover sites that buffer temperature extremes and fluctuations will become increasingly important for survival of tortoises with climate changes and warming.
2. Successful translocations may be limited by suitable cover sites. The authors suggested that during periods of extreme temperatures, suitable cover sites should contain long tunnels and larger openings and that the ability for locations to sustain such cover sites may rely on terrain and surficial geology, e.g., areas supporting caves in old alluvial fans and conglomerate.

Sullivan and others (2015) stated that translocation of species for the purpose of mitigation (to avoid human-wildlife conflicts) can have population, community, and genetic consequences both at the site where the species was removed and introduced, such as disease transmission (e.g., *Gopherus agassizii*), destabilizing interactions among species in the area, and uncertain viability of the translocated species. Both high return rates or dispersal from release sites, with the potential to become a nuisance elsewhere, have been documented for translocated animals. The authors found that some long-lived reptile species have complex social interactions and have intimate knowledge of their resident environment, returning annually to known water resources and refugia, with translocated animals often exhibiting significantly higher movement rates, larger home ranges, and greater mortality than resident animals. The authors found that carefully preplanning the translocation by considering the original habitat, finding or creating burrows at the new site, moving animals shorter distances, moving social groups together, moving them early in the active season or prior to aestivation, moving younger animals that have yet to establish a home range, vaccinating, using soft-release techniques, and releasing under protective cover and in the direction of intended travel—considerations similar to conservation translocations (to augment declining populations)—should improve the success of mitigation translocations.

4.1.2 No-Action Alternative Impacts

4.1.2.1 Impacts

Vegetation

Under the No-Action Alternative, the Marine Corps would conduct translocation of desert tortoises at recipient areas (see Table 2.1-2) as identified in the 2011 GTP (Appendix A). For a complete project description, refer to Chapter 2. Section 4.1.1.1 iterates the components of fence design that directly pertain to the vegetation analysis in this SEIS. All fences and associated roads would be on the Combat Center.

Installation of the proposed fences and maintenance roads described in Section 2.1.4.2, including that for the constrained dispersal sites, would impact approximately 122.4 acres (49.5 ha) of desert scrub and 29.6 acres (12 ha) of relatively barren badlands, rock outcrops, and cliffs (Table 4.1-1). These impact areas represent approximately 0.44% of the total desert scrub and 0.17% of the total badlands, rock outcrops, and cliffs found within the proposed recipient areas, alternate recipient areas, and Special Use Areas under the No-Action Alternative (see Table 3.1-1). Vegetation classifications considered in this SEIS are described in Section 3.1.4.2.

Table 4.1-1. Vegetation Impacts from Fence Construction (No-Action Alternative)

Fence Type	Land Cover/ Vegetation Type Active and Stabilized Dune	Land Cover/ Vegetation Type Badlands, Rock Outcrops, and Cliffs	Land Cover/ Vegetation Type Desert Playa	Land Cover/ Vegetation Type Desert Scrub	Land Cover/ Vegetation Type Desert Wash	Land Cover/ Vegetation Type Developed	Land Cover/ Vegetation Type Riparian Woodland and Shrubland	Total Impacts
Tortoise Exclusion Fencing	-	29.6	-	29.3	-	-	-	58.9
Tortoise Exclusion Fencing and Access Roads (Constrained Dispersal Sites)	-	-	-	93.1 ¹	-	-	-	93.1 ¹
Total Impacts	-	29.6	-	122.4	-	-	-	152.0

Notes: Numbers are provided in acres.

¹For purposes of this analysis, all areas impacted from the fence construction and associated maintenance (and access) road for constrained dispersal sites are assumed to occur in desert scrub.

The precise fence alignment would be established on-site in the presence of an Authorized Biologist to avoid damage to long-lived woody or succulent plants, where possible, as well as protected and special status species, while also making it easier to excavate the trench. The fenceline would be inspected regularly and reinforced as required to minimize erosion; any damage found to the tortoise fencing would be repaired immediately as identified in the 2011 GTP. On BLM land, all vehicular traffic associated with tortoise translocation activities would be limited to routes that have been designated “open” by the BLM (with signs) and no new access roads or cross-county vehicle travel would be permitted. Additionally, fencing would likely provide increased protection to desert vegetation and tortoise habitat within the established Special Use Areas by limiting unauthorized access to the areas by OHVs or other vehicles.

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and given the relatively limited acreage of vegetation affected by fence construction, impacts to vegetation and plant communities as a whole would be less than significant under the No-Action Alternative. Additional mitigation measures that may be implemented to further reduce vegetation-related impacts (but have not been included in the effects analysis above) include:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil, revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.

If mitigation measure BIO-1 is implemented, the vegetation impacts associated with construction of the constrained dispersal sites (see Table 4.1-1) could be partially mitigated.

Protected and Special Status Species

Desert Tortoise

This section describes the potential impacts that the No-Action Alternative might have on translocated and resident tortoises as well as the overall tortoise population. Based on the discussion presented in Section 4.1.1.3, *Previous Translocation Efforts and Related Research*, translocations of any distance would cause adverse impacts to desert tortoises. The majority of these impacts are to translocated (rather than resident) tortoises, and the type and magnitude of the adverse effects vary depending on the distance of the translocation and environmental conditions. Except for occasional handling of control tortoises (discussed below), control tortoises would not be affected.

Impacts to Tortoise Home Ranges and Related Consequences - Physical: Brand et al. (2016) summarizes impacts to desert tortoise home ranges (and subsequent consequences) as follows. Additional discussion is provided further below.

Prior studies indicated [that translocated] tortoise movements increased initially post-translocation, after which [the translocated] tortoises established home ranges, movement behavior, or space-use indistinguishable from control tortoises (Farnsworth et al. 2015; Field et al. 2007; Nussear et al. 2012). Increased movement was likely due to either homing to familiar areas (Hinderle et al. 2015) or questing after shelter, food, or mates in unfamiliar areas, and Sullivan et al. (2015) suggested translocations have a low success rate when judged by increased movement. Translocation to unfamiliar areas may reduce the ability of individuals to locate burrows or other cover sites important for thermoregulation, and could have negative consequences on body temperature, condition,

growth, or mortality (Berry 1986; Bulova 2002; Field et al. 2007). Behavioral thermoregulation, during which tortoises retreat into burrows to regulate body temperature and avoid water loss, is an important coping mechanism in the face of potentially lethal summer temperatures that could impact tortoises differently on the basis of gender or age (Bulova 2002; Harless et al. 2009; Morafka and Berry 2002; Naegle 1976; Rautenstrauch et al. 2002; Zimmerman et al. 1994). Growth, condition, or survival could also be reduced if affected tortoises are under greater thermal stress (Field et al. 2007; Nagy et al. 2002).

Translocated desert tortoises would be required to establish new home ranges. The impacts would occur regardless of distance involved, but as mentioned above, the type and magnitude of the adverse effects vary depending on the distance of the translocation. Consistent with Hinderle et al. (2015), for purposes of this discussion, translocation distances are referred to as “short” if they are approximately 1 mile (2 km) long or less, “medium” if they are approximately 3 miles (5 km) long, and “long” if they are approximately 5 miles (8 km) long or greater. The proposed action (all alternatives) would involve translocating tortoises short, medium, or long distances (see Appendix A).

Benefits of short-distance translocations relative to long-distance translocations include the possibility that the translocated tortoise could remain within a portion of its former home range. Should this occur, the increased familiarity of the tortoise with its surroundings has been shown to limit the amount of time needed to establish a new home range to 1-2 active seasons (Farnsworth et al. 2015). Limiting the time required to establish a new home range reduces stress on the translocated animal, reduces the time that the animal is exposed to greater risk of predation, and reduces the amount of time that the animal would spend overheated. Drawbacks of such short-distance translocations, however, include the fact that a large percentage may try to return home (e.g., Hinderle et al. [2015] reported 44% of tortoises translocated a short distance successfully returned home). Tortoise exclusion fencing would be installed to prevent the tortoises from returning home; this technique, however, has other drawbacks. Homing tortoises may endlessly pace along the fence, searching for a way around the fence, and thereby negate the benefits of short-distance translocations described above. The Combat Center would consult with USFWS regarding the appropriate course of action to take for any desert tortoise repeatedly found fence-pacing. Under all alternatives, if exclusion fencing is installed when tortoises are known to be active (either from spring through fall or in winter during unusually warm weather), then all installed exclusion fence (partial or complete) would be checked 2-3 times daily for 2 weeks to ensure that no tortoise is fence-walking to the point of exhaustion or overexposure. If midday temperatures are above thresholds at which tortoises must go underground to escape heat (approximately 109.4°F [43°C] ground temperature), fence checks would occur 1 hour prior to this threshold being reached. The Combat Center would also actively coordinate with the USFWS to determine the most effective method to reduce potential adverse effects to tortoise from fence-walking in extreme heat as a result of translocation activities, which may include installing artificial shade structures (as recommended by Brand et al. 2016) along the length of the fences during construction.

As described by several studies in Section 4.1.1.3, long-distance translocations result in tortoises spending more time to explore their new surroundings and establish home ranges, during which they are subject to greater risk of predation and heat stress. Some translocated tortoises are expected to immediately start moving away from the release site, and some of these may move relatively large distances (one tortoise monitored by Hinderle et al. [2015] moved more than 6.25 miles [10 km] after translocation), particularly since all translocated tortoises would be wild tortoises that have not been raised or held in pens (Nafus et

al. 2016). It has also been shown that it can take as many as 3 or 4 years for translocated tortoises to establish normal home ranges.

As described in Section 2.1.4, *Other Research*, the Marine Corps, in consultation with USFWS, identified a research program to benefit recovery of the desert tortoise. To encourage home range establishment sooner, constrained dispersal (an experimental technique included under all action alternatives – see Section 2.1.4.2) is proposed for a portion of the translocated tortoises. Results of the constrained dispersal research are expected to be topical, important for recovery, and help inform future management actions, including future translocations at the Combat Center that would be conducted prior to future MEB-training activities under all alternatives.

Although more research is needed, results and discussion from Hinderle et al. (2015) indicate that medium-distance translocations (of approximately 3 miles [5 km]) might minimize (but not eliminate) the worst impacts associated with desert tortoise translocation. Under the proposed action (all alternatives), most of the tortoises would be translocated “long” distances.

Brand et al. (2016) reported that translocated male tortoises have higher temperatures than translocated female tortoises, as males tend to have larger home ranges and to move more following translocation. They also reported that translocated desert tortoises may cause resident immature desert tortoises to have higher body temperatures but that the mechanism by which this might happen is unknown and the result is based on a very small sample size. As such, this potential impact to resident immature tortoises is considered speculative and, in any event, would be temporary.

The various impacts described above would be adverse but temporary. These impacts would also be expected to increase the risk of mortality until they subside, but based on past research efforts (and unlike drought), the increased risk of mortality is small, unquantifiable, not statistically significant, and not a driver of desert tortoise mortality following translocation (Field et al. 2007; Esque et al. 2010; Nussear et al. 2012; Farnsworth et al. 2015; Brand et al. 2016). These impacts would also be minimized by, for example, hydrating tortoises prior to release, releasing them during cooler parts of the day and year, and ensuring that all recipient areas have suitable habitat, including adequate shrub cover.

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and for the reasons described above, the impacts to the home ranges of translocated desert tortoises and the resulting physical consequences that follow would be adverse but less than significant. These impacts would be reduced further if potential mitigation measures regarding thermoregulation and predator control, as described below in the discussion of impacts related to fencing, are implemented.

Impacts to Tortoise Home Ranges and Related Consequences - Social: Translocating desert tortoises would also affect the complex social structure of both translocated and resident tortoises (Alberts et al. 1994; BLM 2007; Hinderle et al. 2015; Sullivan et al. 2015). Results from Harless et al. (2009) suggest that male resident tortoises would not need to modify their home range due to the translocated tortoises, but female resident tortoises would adjust their home range if a translocated female tortoise were to establish an overlapping home range. Both Harless et al. (2009) and O'Connor et al. (1994), however, suggest that desert tortoises are not territorial. As such, territorial fighting among translocated and/or resident tortoises would not be expected.

Although the introduction of translocated tortoises would not necessarily cause resident tortoises at recipient areas to adjust their home range, the proposed translocation under all alternatives would compel translocated and resident tortoises to develop and adjust to a new social structure. The amount of time

needed to adjust would increase with the amount of time needed to establish new home ranges and would therefore increase with longer translocation distances.

The various impacts described above would be adverse but temporary. Efforts would be made under all alternatives to release translocated tortoises in groupings spatially and socially similar to that from where they were removed (as recommended by Sullivan et al. 2015 and as described in the translocation plans [Appendix A]), thereby minimizing the potential for males fighting over mates and other impacts to social structures.

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and for the reasons described above, the impacts to the home ranges of translocated desert tortoises and the resulting social consequences that follow would be adverse but less than significant. No additional mitigation has been identified to further reduce these impacts.

Population Viability: Within this analysis, the “population viability” of a site refers to whether the adult tortoise density at a site meets the minimum density necessary to prevent the population from collapsing due to inability for tortoises to find a mate, which is thought to be 10.0 tortoises per square mile (3.85 tortoises per km²) (USFWS 1994). Adverse extrinsic factors may also affect population viability.

The maximum population density supportable by any given recipient site is unknown, but better tortoise habitat may support more tortoises. Consistent with Hinderle et al. (2015), selection of specific translocation areas under the No-Action Alternative would take into account population densities, disease status of both recipient and donor populations, present and future anthropogenic influences, predator densities, and habitat structure. The recipient areas (described briefly in Table 3.1-3 and in more detail in Appendix A) were selected based on their proximity to protected lands, a low likelihood of negative impacts, high likelihood of intact habitat, and a connection to adjacent tortoise populations. Therefore, it is expected that the specific recipient areas that would be selected through implementation of the No-Action Alternative would contain high quality habitat that would support relatively high population levels, especially since tortoise densities in the area of the proposed action have been recorded as much higher in the past, and it appears the declines have had little or nothing to do with habitat quality (MCAGCC 2011). Therefore, it is anticipated that higher densities can be supported by the existing habitat at the proposed recipient areas.

The most recent tortoise abundance data in the proposed recipient areas under the No-Action Alternative is from the 2009 Tortoise Regional Estimate of Density Model survey and are provided in Table 3.1-3. Under the No-Action Alternative, post-translocation tortoise densities at the recipient areas would range from 25.35 tortoises per square mile (9.75 per km²) to 58.5 tortoises per square mile (22.5 per km²) and would be well above the 10.0 tortoises per square mile (3.85 per km²) that has been suggested as the minimum necessary to sustain the population (USFWS 1994). Moreover, as described in Chapter 2, the Marine Corps, in consultation with USFWS, identified a research program to benefit recovery of the species that includes increasing desert tortoise densities at translocation recipient areas and sites. Results of this research are expected to be topical and important for recovery.

Extrinsic factors, such as drought, the presence of predators, long-term habitat degradation or habitat loss, population fragmentation, and disease may adversely affect a population; when combined, these factors may overwhelm a population’s ability to recover, especially for long-lived and slow-growing species such as the desert tortoise. Long-term habitat loss is addressed by selecting sites that have relatively few present and future anthropogenic influences. Disease and habitat connectivity are discussed in more detail further below.

Therefore, augmenting the desert tortoise population at the proposed recipient areas would neither exceed historic population levels supported at those areas nor result in population densities too low for viability. Furthermore, if increased tortoise density helps tortoises spend less energy searching for mates, the proposed translocation could benefit the desert tortoise. As such, impacts to the population viability at the proposed recipient areas would be less than significant. No additional mitigation has been identified to further reduce these impacts.

Fence Construction: As described above in the vegetation impacts discussion under the No-Action Alternative, fence construction would permanently affect approximately 122.4 acres (49.5 ha) (0.44%) of all desert scrub vegetation and approximately 29.6 acres (12.0 ha) (0.17%) of all badlands, rock outcrops, and cliffs within the recipient areas, alternative recipient areas, and proposed special use areas. Desert scrub often supports desert tortoise, and badlands, rock outcrops, and cliffs may also support desert tortoises depending on terrain roughness. Desert washes have also been described as foraging corridors for desert tortoises and are selected by juvenile desert tortoises (Nafus et al. 2016). However, no desert washes would be affected under the No-Action Alternative, as no washes occur within the proposed fencing areas (based on available data).

Under all action alternatives, an Authorized Biologist would be present during all fence installation activities to ensure that placement of the fence would adaptively avoid protected and special status biological resources (e.g., flora and fauna species) and long-lived woody vegetation (see Section 2.6). The fencing would be shifted during construction to avoid all burrows over 1.6 ft (0.5 m) in length and all active burrows, with the fence placed between the avoided burrows and future intensive training.

In addition, under all action alternatives, all fence construction would be monitored by approved Authorized Biologists to ensure that no desert tortoises are harmed. The level of monitoring would depend on the specific fencing activity, but at least one Authorized Biologist would accompany each separate construction team, such that no driving, trenching, fence pulling, or any surface disturbing activities would occur without the immediate presence of an Authorized Biologist. Maps of burrows from the pre-construction survey would be provided to all Authorized Biologists to assist in protecting tortoises. Tortoises encountered during fence construction or subsequent monitoring may be translocated, especially if the fence location leaves them unprotected from human activities. Sections 2.1.2.2 and 2.6.1 describe the post-construction fence monitoring that would occur.

Under all action alternatives, fence construction would likely prevent some resident tortoises from accessing some of their home range. Impacts to any resident tortoise affected in this manner would be similar to those described above for short-distance translocations. The Combat Center would consult with USFWS regarding the appropriate course of action to take for any desert tortoise repeatedly found fence-pacing.

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and for the reasons described above, the impacts to desert tortoises from fence construction would be adverse but less than significant.

Additional mitigation measures that may be implemented to further reduce fence-related impacts (but have not been included in the effects analysis above) include:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil,

revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.

BIO-2. Perching deterrents would be installed on all fence and sign posts that could be used for perching to decrease the threat of raptor and corvid predation on tortoises. Perching deterrents have shown to decrease incidence and length of perching, and as a result, a decrease in predation (Dwyer and Doloughan 2014). Perching deterrents include specifically designed and engineered products, such as Nixalite® bird spikes and Bird-B-Gone bird spiders, and simple home solutions such as driving a nail into the top of a fence post and allowing it to protrude a few inches above the top of the post. These devices could be inspected and repaired or replaced as needed as part of the fence monitoring procedures described in Section 2.1.2.2, *Fencing*.

BIO-3. The Combat Center would furnish all tortoise exclusion fencing with artificial shade structures and consult with USFWS on the specific design criteria (e.g., location, size).

BIO-4. The Combat Center would consult with USFWS regarding the appropriate course of action to take for any desert tortoise repeatedly found fence-pacing.

If mitigation measure BIO-1 is implemented, the vegetation impacts associated with construction of the constrained dispersal sites (see Table 4.1-1) could be partially mitigated.

Predation: Predation combined with other effects (e.g., climate change, disease, habitat loss or disturbance) contributes to the ongoing population decline observed throughout most of the desert tortoise's range (see Section 3.1.4.3). Populations of certain predator species, particularly coyotes, dogs, and ravens, benefit from subsidies associated with human activities, such as increased water and food availability. Low population of typical prey species (e.g., black-tailed jackrabbits [*Lepus californicus*]) during periods of severe drought may cause predators (e.g., coyote [*Canis latrans*]) to switch to less-preferred prey species such as the desert tortoise (Woodbury and Hardy 1948; Peterson 1994; Esque et al. 2010). In a retrospective analysis, Esque et al. (2010) hypothesized that the high mortality rates are consistent with elevated coyote predation due to prey switching under drought conditions and proximity to human subsidies. However, the authors also showed that these high mortality rates were not due to translocation.

The proposed recipient areas were selected in part based on distance from human subsidies to predators. As such, and based on the research above, predation impacts as a result of translocation are expected to be less than significant. These impacts would be reduced further if potential mitigation measures regarding predator control, as described above in the discussion of impacts related to fencing, are implemented. Additional mitigation measures that may be implemented to further reduce predation-related impacts (but have not been included in the effects analysis above) include:

BIO-5. The Combat Center would develop measures to control coyotes and free-roaming dogs (not be applied in wilderness areas).

Desert Tortoise Handling: Handling desert tortoises during translocation could cause the tortoises increased stress, which may result in behavioral and physiological reactions that have the potential to decrease survivorship. Agha et al. (2015) analyzed 17 years of data and found that increases in handling time led to significantly higher probabilities of voiding for juveniles, females, and males. Voiding can lead to dehydration, and dehydration has been known to cause high mortality in populations of desert tortoise in the Eastern Mojave Desert (Peterson 1994). Rostal et al. (1994) found that prolonged handling (>10 minutes) of captive tortoises before or during blood sampling may increase stress hormone

(testosterone) levels. However, Drake et al. (2012) found that handling and translocation did not increase stress hormone (corticosterone) levels in desert tortoises.

Translocation activities include collection, health assessment, transport, and release with rehydration. In addition, transmitters would be removed from 80% of the translocated tortoises. Tortoises could be handled for several hours to more than a day during certain translocation instances, depending on the number of activities expected to take place and the transportation methods used. Tortoises that only need to be moved a few hundred feet would be hand-carried to the release site. Tortoises that must be moved farther from the capture site would be transported by vehicle in individual sanitized containers (see Section 2.1.2.1, *Handling Procedures*). Driving tortoises to the recipient areas could take considerable time and cause considerable stress that may result in bladder voiding.

Impacts of translocation stressors on the desert tortoise would be minimized, however, by adhering to handling procedures outlined in the *Desert Tortoise Field Manual* (USFWS 2009), disease prevention techniques as outlined in *Health assessment procedures for the desert tortoise (Gopherus agassizii)* (USFWS 2016b), and release guidelines as outlined in *Translocation of Mojave Desert Tortoises from Project Sites: Plan Development Guidance* (USFWS 2010b). Measures that would be implemented include:

- Handling of tortoises would be limited to Authorized Biologists who have demonstrated to the USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately.
- Translocation would occur when ambient temperatures are within guidelines approved by the USFWS.
- Tortoises transported by vehicle would be transported in individual sanitized containers, kept in a shaded, 75°F to 80°F environment and placed on a well-padded surface to minimize internal and shell trauma.
- Only existing roads or routes would be used to transport tortoises.
- Hydrating all tortoises prior to release.
- Tortoises would be thoroughly rinsed to remove odors potentially attractive to predators.

To further reduce the impacts of translocation stressors, recipient sites would be selected based on habitat quality and similar topography/terrain of the tortoise's original home range. By releasing translocated tortoises in groupings spatially and socially similar to where they were removed from, stress would be minimized as much as possible. Consequently, handling impacts to translocated desert tortoises would be less than significant.

The handling-related impacts of resident and control desert tortoises would be limited to processing activities (i.e., measuring and sexing, assessing health, replacing or removing transmitter, etc.). As with translocated tortoises, handling resident and control tortoises could spread disease. However, all such handling would be performed by an Authorized Biologist that would follow USFWS guidelines (USFWS 2009) to minimize both stress and the risk of spreading disease. As such, adverse impacts to resident and control desert tortoises from handling would be minimized.

Any nests found between November 1 and April 15 are unlikely to be viable and would not be moved. In the event that nests are found between April 15 and October 31, the nests would be moved. Eggs would be inspected to determine if they are viable and, if so, would be moved to a similar microsite (e.g., cover,

plant species, soil type, substrate, aspect) on the recipient areas using standard techniques (e.g., Desert Tortoise Council 1994; USFWS 2009b).

Therefore, the impacts to desert tortoises from handling would be adverse but less than significant. No additional mitigation has been identified to further reduce these impacts.

Additional Disease-Related Concerns: Translocation of desert tortoises could not only cause additional stress that could result in higher susceptibility to diseases, but it could also increase the potential for the spread of diseases between the population within the recipient areas and the population to be translocated (Rideout 2015). Risk of disease spread through translocation is dependent both on the type of the disease, the health of the desert tortoise populations, as well as the method in which the translocation is carried out.

Translocation under the No-Action Alternative would include performing research on the potential for vertical transmission of disease as well as assessing the health status of translocated tortoises and those at the recipient site, as well as long-term monitoring of effects on translocated and recipient populations. Specifically, implementation of the No-Action Alternative (Section 2.1) would minimize the potential for spread of diseases and susceptibility to disease because:

- All tortoise handling would be accomplished by techniques outlined in the *Desert Tortoise Field Manual* (USFWS 2009), including the most recent disease prevention techniques (e.g., USFWS 2016b).
- Tortoises to be translocated are not located near human population centers which have been shown to have a high the prevalence of Upper Respiratory Tract disease within desert tortoises (Berry et al. 2006, 2015).
- Health assessments of the desert tortoises would be performed for at least 2 years before translocation and assessments would evaluate tortoises in the moderate and heavy impact areas, recipient areas, and control areas.
- Final health assessments would be conducted before translocation. The incidence of disease and other health issues would be monitored using body condition indices, clinical signs of disease, and visual inspection for injuries. This would be accomplished using both telemetered tortoises and all tortoises captured on mark-recapture plots.
- Any health problems observed (e.g., rapid declines in body condition, perceived outbreaks of disease, mortality events) would be reported to the USFWS, CDFW, and BLM such that appropriate actions can be taken in a timely manner.
- Results of health assessment would in part determine where the final recipient locations would occur. Desert tortoises that exhibit moderate to severe nasal discharge would not be translocated, and may be sent to a USFWS-approved facility where they would undergo further assessment, treatment, and/or necropsy.
- Disease prevalence within the resident desert tortoise population would be less than 20%.
- The recipient areas would continue to be monitored post-translocation (see Section 2.1.3).

Therefore, the impacts to desert tortoises from the risk of disease would be adverse but less than significant. Nonetheless, at the request of CDFW, the Combat Center has agreed to not translocate

ELISA-positive³ tortoises into designated Critical Habitat. No mitigation has been identified to further reduce these impacts.

Grazing: Under the No-Action Alternative, tortoises would be translocated into the active Ord Mountain Grazing Allotment. Several studies found evidence to support the negative impacts to habitat associated with cattle grazing. The presence of cattle impacts both food availability (Jennings and Berry 2015) and soil quality (Brooks et al. 2006). In particular, one literature review by Fleischner (1994) shows that cattle grazing reduces above-ground biomass of annuals and cover of perennial shrubs, which was shown to lead to degradation of the Mojave desert scrub vegetation community. Lovich and Bainbridge (1999) reviewed the literature on soil effects of grazing up until 1998 and showed that cattle disturb mechanical and chemical crusts found in desert soils. Both literature reviews state that the damage caused by cattle could be long-lasting. In addition, Nussear et al. (2012) found incidental tortoise mortality as a result of burrow collapse by cattle (one of 191 tortoises over a multi-year monitoring effort).

However, while there is information that shows both long-term and short-term changes to habitat as a result of grazing, the detrimental effects are uncertain and some benefits may accrue (Ellison 1960). Specific to desert tortoises, little definitive and focused research has been completed on the effects of cattle grazing (Oldemeyer 1994; Avery 1998; Lovich and Bainbridge 1999). Studies to illuminate the specific grazing factors that affect desert tortoises would assist USFWS and CDFW in recovery efforts. These studies also may assist the allotment operator in revising grazing management practices to accommodate both cattle and tortoises. Such studies are encouraged by the revised desert tortoise recovery plan (USFWS 2011a).

Therefore, as described above, tortoises translocated to active Ord Mountain Grazing Allotment may be adversely affected by ongoing cattle grazing. These impacts are expected to be less than significant, however, because cumulative habitat effects from ongoing grazing operations would have already occurred by the time that habitat quality was assessed. No mitigation has been identified to further reduce these impacts.

Regional Connectivity: As mentioned in Section 4.1.1, *Approach to Analysis*, adverse effects associated with removing desert tortoises from the moderate and heavy impact areas are considered in the 2012 Final EIS and are not considered in this SEIS. Under the No-Action Alternative, the proposed recipient areas are largely located along the Combat Center's northwestern border, within and around the southeastern boundary of the Ord-Rodman Critical Habitat Unit (see Figure 3.1-1). Translocating tortoises to these areas would have a beneficial impact of improving connectivity within the localized region, particularly in a northeast-southwest direction, but may have little effect overall. Construction of the proposed fences would also have a beneficial impact by preventing the moderate and heavy impact areas from becoming a population "sink," another beneficial impact.

Therefore, as described above, these impacts are expected to be less than significant. No mitigation has been identified to further reduce these impacts.

Genetic Considerations: Several studies have found genetic differentiation among desert tortoises that varies across the landscape, including within the Western Mojave Recovery Unit (Murphy et al. 2007; Edwards and Berry 2013; Averill-Murray and Hagerty 2014). It is possible that this genetic differentiation may be due to adaptation to the local environment, in which case it is also possible that that neither translocated tortoises nor their offspring would be adapted to the their new local environment.

³ ELISA-positive indicates past exposure to pathogens, not a current infection.

If this were to occur, the fitness of the resident population to the local environment may also be reduced over time by mating with translocated tortoises or their offspring; this phenomenon is known as “outbreeding depression.”

Under the No-Action Alternative, however, none of the potential impacts described above would occur. As described in Section 3.1.4.3, the Combat Center, WEA and SEA (i.e., the tortoise translocation donor sites), and the proposed control and recipient areas and sites (under all alternatives) are located within the Southern Mojave region proposed by Murphy et al. (2007), the smallest management unit ever proposed.⁴ Furthermore, Averill-Murray and Hagerty (2014) reported that tortoise populations within 124 miles (200 km) of each other are genetically correlated and therefore concluded that translocating tortoises from their original site to a recipient site within 124 miles (200 km) has a low probability of causing outbreeding depression. Under the No-Action Alternative, tortoises would be translocated no more than approximately 25 miles (40 km) (see Appendix A).

Therefore, implementation of the No-Action Alternative would have a less than significant effect on desert tortoise genetics. No mitigation has been identified to further reduce these impacts.

4.1.3 Alternative 1 Impacts

4.1.3.1 Impacts

Vegetation

Under Alternative 1, the Marine Corps would conduct translocation of desert tortoises at recipient sites (see Table 2.2-1) as identified in the March 2016 Translocation Plan (Appendix A; MCAGCC 2016b). For a complete project description, refer to Chapter 2. Section 4.1.1.1 iterates the components of fence design that directly pertain to the vegetation analysis in this SEIS. All fences and associated roads would be on the Combat Center.

It is anticipated that trench excavation during fence installation and the adjacent surface disturbance associated with the vehicle maintenance road (19 ft [6 m] combined width) would impact approximately 0.1 acre (0.04 ha) of active and stabilized dune; 24.3 acres (9.8 ha) of badlands, rock outcrops, and cliffs; 68.5 acres (27.7 ha) of desert scrub; and 4.12 acres (1.7 ha) of desert wash (see Table 4.1-2). These impact areas represent approximately 0.07% of the total active and stabilized dune; 0.07% of the total badlands, rock outcrops, and cliffs; 0.07% of the total desert scrub; and 0.13% of the total desert wash found within the proposed recipient and control sites under Alternative 1 (see Table 3.1-2). The fenceline would cross washes in some places and would be reinforced to minimize erosion, or built to break away in floods to be followed by quick repair (MCAGCC 2016b).

Post-mounted signs would also be installed under Alternative 1 but would be located along an existing road in the Special Use Area in the WEA, on previously disturbed land, and minimal impacts to vegetation are anticipated. As described under the No-Action Alternative (Section 4.1.2.1), temporary equipment laydown areas (located on the new maintenance road) may also be required during fence installation but are captured under the impact acreages described above and in Table 4.1-2.

⁴ As described in Section 3.1.4.3, the proposed Southern Mojave Management Unit was acknowledged and rejected in the 2011 Recovery Plan based on more recent research (Allendorf and Luikart 2007; Hagerty and Tracy 2010; Hagerty et al. 2010; USFWS 2011a).

Table 4.1-2. Vegetation Impacts from Fence Construction (Alternative 1)

Fence Type	Land Cover/ Vegetation Type Active and Stabilized Dune	Land Cover/ Vegetation Type Badlands, Rock Outcrops, and Cliffs	Land Cover/ Vegetation Type Desert Playa	Land Cover/ Vegetation Type Desert Scrub	Land Cover/ Vegetation Type Desert Wash	Land Cover/ Vegetation Type Developed	Land Cover/ Vegetation Type Riparian Woodland and Shrubland	Total Impacts
Fencing (<i>Permanent</i>)	0.1	20.9	-	54.1	2.32	-	-	77.42
Tortoise Exclusion (<i>Temporary</i>)	-	3.4	-	14.4	1.8	-	-	19.6
Total Impacts	0.1	24.3	-	68.5	4.12	-	-	97.02

Note: Numbers are provided in acres.

All SCMs and mitigation measures identified under the No-Action Alternative (Section 4.1.2.1) would also apply under Alternative 1, in addition to measures referenced above.

Therefore, with implementation of the SCMs (see Section 2.6) and mitigation measures, and given the relatively limited acreage of vegetation that would be affected by fence construction, impacts to vegetation and plant communities as a whole would be less than significant under Alternative 1. Additional mitigation measures that may be implemented to further reduce vegetation-related impacts (but have not been included in the effects analysis above) include:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil, revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.

If mitigation measure BIO-1 is implemented, the vegetation impacts associated with construction of the constrained dispersal site and southern Bullion RTA temporary fence (Table 4.1-2) could be partially mitigated.

Protected and Special Status Species

Desert Tortoise

In general, Alternative 1 does not differ from the No-Action Alternative in ways that would change impacts described in Section 4.1.2.1, with the following exceptions described below.

Impacts to Tortoise Home Ranges and Related Consequences: The use of one, larger constrained dispersal site instead of four smaller sites would have a beneficial impact to the tortoise because it better accommodates tortoise home range size, and could provide results that would better inform future management actions.

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and for the reasons described above, the impacts to the home ranges of translocated desert tortoises and the resulting physical and social consequences that follow would be adverse but less than significant. These impacts would be reduced further if potential mitigation measures regarding thermoregulation and predator control, as described below in the discussion of impacts related to fencing, are implemented.

Population Viability: Similar to the No-Action Alternative and consistent with Hinderle et al. (2015), the recipient sites for Alternative 1 were selected based on their population densities, disease status of both recipient and donor populations, present and future anthropogenic influences, predator effects, proximity to protected lands and to adjacent tortoise populations, and habitat structure (see Table 3.1-4). Data collection on tortoise density and habitat quality have been ongoing since 2012, allowing for further refinement of the proposed recipient areas under Alternative 1. Since 2013, a total of 11 new mark-recapture plots were established in the translocation areas proposed under Alternative 1, and an additional three were established in the WEA. Tortoise Regional Estimate of Density transect surveys were completed in the translocation areas between 2013 and 2015. Qualitative and quantitative habitat assessments were conducted between 2012 and 2015.

Under Alternative 1, post-translocation tortoise densities at the recipient sites would range from 12.2 tortoises per square mile (4.7 per km²) to 34.3 tortoises per square mile (13.2 per km²) and would be well above the 10.0 tortoises per square mile (3.85 per km²) that has been suggested as the minimum necessary to sustain the population (USFWS 1994).

The consistently high mortality rate throughout the recipient and control areas, recipient and control sites, and broader West Mojave may be the result of California's multi-year drought. The general decline of tortoise population densities in the WEA and SEA, as well as regionally, furthers the expectation that augmenting the desert tortoise population at the proposed recipient sites would not exceed historic population levels supported at those sites. Therefore, augmenting the population at the recipient sites with translocated tortoises should help maintain genetic integrity and connectivity with the current population. Based on this these data, translocation of tortoises to areas of depleted populations is even more likely to occur under Alternative 1 than under the No-Action Alternative, a beneficial impact to desert tortoises.

Headstarting research would be performed under Alternative 1. This would have direct benefits for desert tortoises because headstarted juvenile tortoises have higher survivorship than wild juvenile tortoises, and data on their survivorship after release would better inform future management actions.

Therefore, augmenting the desert tortoise population at the proposed recipient sites would neither exceed historic population levels supported at those sites nor result in population densities too low for viability. Furthermore, if increased tortoise density helps tortoises spend less energy searching for mates, the proposed translocation could benefit the desert tortoise. As such, impacts to the population viability at the proposed recipient sites would be less than significant. No additional mitigation has been identified to further reduce these impacts.

Fence Construction: Implementation of Alternative 1 would impact approximately 53.9 fewer acres (21.8 ha) of desert scrub and 4.12 more acres (1.67 ha) of desert wash compared to the No-Action Alternative (see Tables 4.1-1 and 4.1-2). Washes are used as foraging corridors by desert tortoises, can reduce adult dispersal away from translocation sites, and are selected for by juveniles (Nafus et al. 2016). These impact areas represent approximately 0.07% of the total desert scrub and 0.13% of the total desert wash found within the proposed recipient and control sites under Alternative 1 (see Table 3.1-2). In addition, a portion of the fence may be electrified to reduce incursion of coyotes and free-ranging dogs into the constrained dispersal site.

In addition, construction of the fence along the northern edge of the WEA would prevent OHV users from entering this area of the WEA and tortoises from entering the OHV area, thereby protecting the habitat and tortoises within this area.

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and for the reasons described above, the impacts to desert tortoises from fence construction would be adverse but less than significant.

Additional mitigation measures that may be implemented to further reduce fence-related impacts (but have not been included in the effects analysis above) include:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil, revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.
- BIO-2. Perching deterrents would be installed on all fence and sign posts that could be used for perching to decrease the threat of raptor and corvid predation on tortoises. Perching deterrents have shown to decrease incidence and length of perching, and as a result, a decrease in predation (Dwyer and Doloughan 2014). Perching deterrents include specifically

designed and engineered products, such as Nixalite® bird spikes and Bird-B-Gone bird spiders, and simple home solutions such as driving a nail into the top of a fence post and allowing it to protrude a few inches above the top of the post. These devices could be inspected and repaired or replaced as needed as part of the fence monitoring procedures described in Section 2.1.2.2, *Fencing*.

BIO-3. The Combat Center would furnish all tortoise exclusion fencing with artificial shade structures and consult with USFWS on the specific design criteria (e.g., location, size).

BIO-4. The Combat Center would consult with USFWS regarding the appropriate course of action to take for any desert tortoise repeatedly found fence-pacing.

If mitigation measure BIO-1 is implemented, the vegetation impacts associated with construction of the constrained dispersal site and southern Bullion RTA temporary fence (see Table 4.1-2) could be partially mitigated.

Predation: Under Alternative 1, the Combat Center would implement a predator control program described in Section 2.2.3. This would include monitoring, education, and active control measures of subsidized predators. While this would not significantly depress range-wide populations of these predators, it may provide local relief to desert tortoise populations from predation.

The proposed recipient areas were selected in part based on distance from human subsidies to predators. As such, and based on the research above, predation impacts as a result of translocation are expected to be less than significant. These impacts would be reduced further if potential mitigation measures regarding predator control, as described above in the discussion of impacts related to fencing, are implemented.

Desert Tortoise Handling: The use of helicopters to transport tortoises would greatly reduce the amount of time they are handled as well as the stress associated with long handling periods. Therefore, the impacts to desert tortoises from handling would be adverse but less than significant. No additional mitigation has been identified to further reduce these impacts.

Additional Disease-Related Concerns: Insufficient numbers of tortoises with abnormal nasal discharge were found during baseline and clearance surveys to support study of the vertical transmission of disease. As such, Alternative 1 eliminates this potential research from further consideration. Therefore, the impacts to desert tortoises from the risk of disease would be adverse but less than significant. No mitigation has been identified to further reduce these impacts.

Grazing: Research on the effects of cattle grazing on desert tortoises may help inform future management actions regarding cattle grazing that could, in turn, have a beneficial impact to tortoises that extends well beyond the study area. In addition, the USFWS would approve the design of the study before it is implemented.

Therefore, as described above, tortoises translocated to active Ord Mountain Grazing Allotment may be adversely affected by ongoing cattle grazing. These impacts are expected to be less than significant, however, because cumulative habitat effects from ongoing grazing operations would have already occurred by the time that habitat quality was assessed. No mitigation has been identified to further reduce these impacts.

Regional Connectivity: The recipient sites under Alternative 1 would not benefit desert tortoise connectivity along the Combat Center's northwestern boundary as strongly as the No-Action Alternative, but connectivity within and around the other proposed recipient sites would be improved. The Siberian recipient site (near the center of the Combat Center's northern border) and Bullion recipient sites (at the

southeastern corner of the Combat Center) would have the potential to help improve tortoise connectivity along the Combat Center's northern and eastern boundaries, but this potential is limited by the low population density of tortoises in the areas between these two sites (see Figure 3.1-1).

Therefore, as described above, these impacts are expected to be less than significant. No mitigation has been identified to further reduce these impacts.

Genetic Considerations: Physical and genetic distance research would help inform degree and timing of assimilation of translocatees with residents, helping measure translocation effectiveness. Therefore, implementation of the Alternative 1 would have a less than significant effect on desert tortoise genetics. No mitigation has been identified to further reduce these impacts.

4.1.4 Alternative 2 (Preferred Alternative) Impacts

4.1.4.1 Impacts

Vegetation

Impacts to vegetation under Alternative 2 would be similar to those under Alternative 1. However, under Alternative 2, and as described in the June 2016 Translocation Plan (Appendix A; MCAGCC 2016c), the Bullion recipient site would not be established, so there would be a total of five recipient sites and six control sites (see Table 2.3-1). Additionally, the Bullion control site would be located on the Combat Center in the Special Use Area immediately north of Cleghorn Lakes Wilderness Area (see Figure 2.3-2), instead of in the northwest portion of the Cleghorn Lakes Wilderness Area under Alternative 1. For a complete project description, refer to Chapter 2. Section 4.1.1.1 iterates the components of fence design that directly pertain to the vegetation analysis in this SEIS. Fence types and associated roads under Alternative 2 would be equivalent to Alternative 1 (and on the Combat Center).

Trench excavation and the adjacent surface disturbance associated with the vehicle maintenance road under Alternative 2 would impact fewer total acres than Alternative 1 because the fence associated with the Bullion recipient site would not be constructed. Implementation of Alternative 2 would result in impacts to approximately 0.1 acre (0.04 ha) of active and stabilized dune; 20.9 acres (8.5 ha) of badlands, rock outcrops, and cliffs; 64.9 acres (26.3 ha) of desert scrub; and 2.32 acres (0.94 ha) of desert wash (see Table 4.1-3). As described above, the Bullion recipient site would not be established and the Bullion control site would be relocated. Therefore, impact areas would represent approximately 0.29% of the total active and stabilized dune; 0.07% of the total badlands, rock outcrops, and cliffs; 0.07% of the total desert scrub; and 0.09% of the total desert wash found within the proposed recipient and control sites under Alternative 2 (see Table 3.1-2).

Therefore, with implementation of the SCMs (see Section 2.6) and mitigation measures, and given the relatively limited acreage of vegetation that would be affected by fence construction, impacts to vegetation and plant communities as a whole would be less than significant under Alternative 2.

Additional mitigation measures that may be implemented to further reduce vegetation-related impacts (but have not been included in the effects analysis above) include:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil, revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.

Table 4.1-3. Vegetation Impacts from Fence Construction (Alternative 2)

Fence Type	Land Cover/ Vegetation Type Active and Stabilized Dune	Land Cover/ Vegetation Type Badlands, Rock Outcrops, and Cliffs	Land Cover/ Vegetation Type Desert Playa	Land Cover/ Vegetation Type Desert Scrub	Land Cover/ Vegetation Type Desert Wash	Land Cover/ Vegetation Type Developed	Land Cover/ Vegetation Type Riparian Woodland and Shrubland	Total Impacts
Fencing (<i>Permanent</i>)	0.1	20.9	-	54.1	2.32	-	-	77.42
Tortoise Exclusion (<i>Temporary</i>)	-	-	-	10.8	-	-	-	10.8
Total Impacts	0.1	20.9	-	64.9	2.32	-	-	88.22

Note: Numbers are provided in acres.

If mitigation measure BIO-1 is implemented, the vegetation impacts associated with construction of the constrained dispersal site and southern Bullion RTA temporary fence (see Table 4.1-3) could be partially mitigated.

Protected and Special Status Species

Desert Tortoise

In general, Alternative 2 does not differ from Alternative 1 in ways that would change impacts described in Section 4.1.3.1, with the following exceptions described below.

Population Viability: Alternative 2 is similar to Alternative 1, except that it is based on the latest translocation guidance from the USFWS (2016a). As a result, this alternative places greater emphasis on augmenting depleted populations.

Table 3.1-3 briefly describes the proposed recipient sites; refer to Appendix A for additional details. Under Alternative 2, post-translocation tortoise densities at the recipient sites would range from 14.3 tortoises per square mile (5.5 per km²) to 27.0 tortoises per square mile (10.4 per km²) and would be well above the 10.0 tortoises per square mile (3.85 per km²) that has been suggested as the minimum necessary to sustain the population (USFWS 1994).

Therefore, augmenting the desert tortoise population at the proposed recipient sites under Alternative 2 would neither exceed historic population levels supported at those sites nor result in population densities too low for viability. Furthermore, if increased tortoise density helps tortoises spend less energy searching for mates, the proposed translocation could benefit the desert tortoise. As such, impacts to the population viability at the proposed recipient sites would be less than significant. No additional mitigation has been identified to further reduce these impacts.

Fence Construction: Implementation of Alternative 2 would impact approximately 3.6 fewer acres (1.5 ha) of desert scrub and 1.8 fewer acres (0.73 ha) of desert wash compared to Alternative 1 (see Tables 4.1-2 and 4.1-3). Washes are used as foraging corridors by desert tortoises, can reduce adult dispersal away from translocation sites, and are selected for by juveniles (Nafus et al. 2016). These impact areas represent approximately 0.07% of the total desert scrub and 0.09% of the total desert wash found within the proposed recipient and control sites under Alternative 2 (see Table 3.1-2).

Therefore, with implementation of the aforementioned SCMs (see Section 2.6), and for the reasons described above, the impacts to desert tortoises from fence construction would be adverse but less than significant.

Additional mitigation measures that may be implemented to further reduce fence-related impacts (but have not been included in the effects analysis above) include:

- BIO-1. Upon the eventual removal of tortoise exclusion fencing associated with the constrained dispersal sites, the fence areas would be restored to pre-existing conditions to the maximum extent practicable; this may include filling the trench with adjacent disturbed soil, revegetating the fenceline with native plants, and tilling the maintenance road (and potentially the access road) if sufficient evidence of compaction is observed.
- BIO-2. Perching deterrents would be installed on all fence and sign posts that could be used for perching to decrease the threat of raptor and corvid predation on tortoises. Perching deterrents have shown to decrease incidence and length of perching, and as a result, a decrease in predation (Dwyer and Doloughan 2014). Perching deterrents include specifically

designed and engineered products, such as Nixalite® bird spikes and Bird-B-Gone bird spiders, and simple home solutions such as driving a nail into the top of a fence post and allowing it to protrude a few inches above the top of the post. These devices could be inspected and repaired or replaced as needed as part of the fence monitoring procedures described in Section 2.1.2.2, *Fencing*.

BIO-3. The Combat Center would furnish all tortoise exclusion fencing with artificial shade structures and consult with USFWS on the specific design criteria (e.g., location, size).

BIO-4. The Combat Center would consult with USFWS regarding the appropriate course of action to take for any desert tortoise repeatedly found fence-pacing.

If mitigation measure BIO-1 is implemented, the vegetation impacts associated with construction of the constrained dispersal site and southern Bullion RTA temporary fence (see Table 4.1-3) could be partially mitigated.

Regional Connectivity: The recipient sites under Alternative 2 would not benefit desert tortoise connectivity along the Combat Center's northwestern boundary as strongly as the No-Action Alternative, but connectivity within and around the other proposed recipient sites would be improved. The Siberia recipient site (near the center of the Combat Center's northern border) would have the potential to help improve tortoise connectivity along the Combat Center's northern boundary, but this potential is limited by the low population density of tortoises in the areas around this site (see Figure 3.1-1).

Therefore, as described above, these impacts are expected to be less than significant. No mitigation has been identified to further reduce these impacts.

4.1.5 Summary of Impacts – Biological Resources

With implementation of the SCMs (see Section 2.6), and for the reasons described above, impacts to biological resources would be adverse but less than significant under all action alternatives (Table 4.1-4). There would be adverse but less than significant impacts to vegetation due to construction of the fence and associated maintenance roads, and impacts to wildlife would be negligible. There would also be adverse but less than significant impacts, as well as beneficial but less than significant impacts, to desert tortoises. These impacts would be reduced further if potential mitigation measures are implemented.

Table 4.1-4. Summary of Impacts for Biological Resources

Alternative	Impacts
No-Action Alternative	<p>LSI <u>Vegetation</u></p> <ul style="list-style-type: none"> LSI because fence and associated maintenance road construction would impact approximately 122.4 acres (49.5 ha) of desert scrub and 29.6 acres (12 ha) of relatively barren badlands, rock outcrops, and cliffs (Table 4.1-1). These impact areas represent approximately 0.44% of the total desert scrub and 0.17% of the total badlands, rock outcrops, and cliffs found within the proposed recipient areas, alternate recipient areas, and Special Use Areas under the No-Action Alternative. Implementation of the proposed SCMs would reduce these impacts. <p><u>Desert Tortoise</u></p> <ul style="list-style-type: none"> LSI because (1) tortoises would have a higher risk of mortality (e.g., from predation or heat), but the increased risk of mortality is small, unquantifiable, not statistically significant compared to that of resident and control tortoises, and is not a driver of desert tortoise mortality following translocation; (2) every alternative includes project features designed to minimize impacts; (3) impacts, including increased stress, would be temporary; (4) population augmentation at the proposed recipient sites would neither push the population over the carrying capacity nor result in a population that is unviable; (5) fence construction would adversely affect desert tortoise habitat; (6) tortoises would be translocated less than 124 miles (200 km) to areas that are all located within the same Recovery Unit, and therefore adverse genetic impacts would not occur; (7) handling would create stress in translocated tortoises but these effects would be temporary; and (8) tortoises would experience higher levels of stress and would be exposed to new tortoises as a result of translocation, but precautions would be taken and accepted guidelines would be followed to reduce stress and minimize the risk of spreading disease. In addition, SCMs would be implemented to reduce potential impacts. Benefits would occur because (1) research would be performed that could help improve future management actions to recover the species, (2) increased tortoise density could help desert tortoises spend less energy searching for mates, (3) augmenting the recipient sites would help increase the connectivity at and around the recipient sites, and (4) fence construction would help prevent moderate and heavy impact areas from becoming a population “sink.”
Alternative 1	<p>LSI <u>Vegetation</u></p> <ul style="list-style-type: none"> LSI because fence and road construction would impact approximately 0.1 acre (0.04 ha) of active and stabilized dune; 24.3 acres (9.8 ha) of badlands, rock outcrops, and cliffs; 68.5 acres (27.7 ha) of desert scrub; and 4.12 acres (1.7 ha) of desert wash. These impact areas represent approximately 0.07% of the total active and stabilized dune; 0.07% of the total badlands, rock outcrops, and cliffs; 0.07% of the total desert scrub; and 0.13% of the total desert wash found within the proposed recipient and control sites under Alternative 1.

Table 4.1-4. Summary of Impacts for Biological Resources (continued)

Alternative	Impacts
Alternative 1 (continued)	<p>LSI <u>Desert Tortoise</u> Compared to the No-Action Alternative, Alternative 1 would have the following impacts:</p> <ul style="list-style-type: none"> • The use of one, larger constrained dispersal site instead of four smaller sites would have a beneficial impact to the tortoise because it better accommodates tortoise home range size, and could provide results that would better inform future management actions. • Translocation of tortoises to areas of depleted populations is even more likely to occur. • Headstarting research would be performed. • Insufficient numbers of tortoises with abnormal nasal discharge were found during baseline and clearance surveys to support study of the vertical transmission of disease. As such, Alternative 1 eliminates this potential research from further consideration. • Construction of the fence along the northern edge of the WEA would prevent OHV users from entering this area of the WEA and tortoises from entering the OHV area, thereby protecting the habitat and tortoises within this area. • The Combat Center would implement a predator control program. • The use of helicopters to transport tortoises would greatly reduce the amount of time they are handled as well as the stress associated with long handling periods. • Research on the effects of cattle grazing on desert tortoises may help inform future management actions regarding cattle grazing that could, in turn, have a beneficial impact to tortoises that extends well beyond the study area. • Physical and genetic distance research would help inform degree and timing of assimilation of translocatees with residents, helping measure translocation effectiveness.
Alternative 2	<p>LSI <u>Vegetation</u></p> <ul style="list-style-type: none"> • LSI because fence and road construction would impact approximately 0.1 acre (0.04 ha) of active and stabilized dune; 20.9 acres (8.5 ha) of badlands, rock outcrops, and cliffs; 64.9 acres (26.3 ha) of desert scrub; and 2.32 acres (0.94 ha) of desert wash. As described above, the Bullion recipient site would not be established and the Bullion control site would be relocated. Therefore, impact areas would represent approximately 0.29% of the total active and stabilized dune; 0.07% of the total badlands, rock outcrops, and cliffs; 0.07% of the total desert scrub; and 0.09% of the total desert wash found within the proposed recipient and control sites under Alternative 2. <p>LSI <u>Desert Tortoise</u> Compared to Alternative 1, Alternative 2 would have the following impacts:</p> <ul style="list-style-type: none"> • Density research methodologies would be based on the latest translocation guidance from the USFWS (2016a). As a result, this alternative places greater emphasis on augmenting depleted populations.

Legend: LSI = Less Than Significant Impact; km = kilometer; OHV = Off-Highway Vehicle; SCM = Special Conservation Measure; USFWS = U.S. Fish and Wildlife Service; WEA = Western Expansion Area.

4.2 LAND USE

4.2.1 Approach to Analysis

4.2.1.1 Focus of Analysis

Topics analyzed in this section include consistency with land use management plans and policies, changes in land ownership status, and impacts to: recreation and OHV use; grazing, conservation areas, and wilderness areas. Most of the land use impacts associated with the proposed action and alternatives would be direct effects; however, indirect impacts to the visual experience within wilderness areas are addressed with regard to potential fence construction outside wilderness area boundaries. Direct effects were assessed for each alternative by evaluating the consistency of the project activities relative to land use management plans/policies and compatibility with the purpose, management goals, and characteristics or values inherent in each type of land use.

4.2.1.2 Evaluation Criteria

Land use impacts associated with the proposed action and alternatives were evaluated based on the following considerations:

- Would project activities be incompatible with the enforceable provisions of applicable land use plans, policies, and controls, including plans and policies for federally managed lands, state lands, and local jurisdictions?
- Would project activities be incompatible with existing land uses or would they preclude or limit any future land uses that support regional environmental and resource management goals?
- Would project activities result in relocation of residences and/or businesses or otherwise contribute to conditions that would increase the likelihood of such relocations?
- Would project activities be incompatible with the purpose, management goals, and/or resource values and user experience for which designated conservation areas or wilderness areas were established to preserve?

4.2.2 No-Action Alternative Impacts

4.2.2.1 Plans and Policies

In all but one instance, the proposed use of recipient and control areas to support tortoise relocation under the No-Action Alternative (including any fence construction, tortoise transport, post-translocation monitoring, and research activities) would be consistent with existing plans and policies, including the Combat Center's INRMP, the 2014 NDAA, the San Bernardino County General Plan, the CDCA Plan, and the West Mojave Plan. The one exception involves the proposed desert tortoise exclusion fence that would surround the recipient area in the western portion of the WEA, which would limit public access to 2,764 acres (1,082 ha) of the Means Lake (Shared Use Area) Training Area (see Figure 4.2-1). This recipient area was initially identified in the 2012 Final EIS and associated 2013 ROD as a Category 1 Special Use Area (restricted) in the EMUA. However, the NDAA modified the boundary of the Shared Use Area so that it would have overlapped this Category 1 Special Use Area; as a result, this Category 1 Special Use Area is no longer being designated in the Combat Center and Shared Use Area. Limiting public access to the fenced recipient area that overlaps the Shared Use Area would be inconsistent with the intent of the NDAA to expand the Shared Use Area, and with the Johnson Valley OHV Area Management Plan. Because the fencing in this area (if installed) would prevent OHV use within this area

(refer to *Recreation and Off-Highway Vehicles* under Section 4.2.2.3 for a further analysis on OHV recreation activity), the No-Action Alternative would not be consistent with the purpose of EO 11644, which seeks to control OHV use to protect resources or minimize conflicts among the various uses of those lands. This, along with inconsistencies with the intent of the NDAA and the Johnson Valley OHV Area Management Plan, would represent a significant but mitigable impact to land use. All other aspects of the No-Action Alternative would be consistent with relevant plans and policies and would therefore result in no impacts to Land Use.

A potential mitigation measure that could eliminate the potentially significant impact to the plans and policies described above would be:

- LU-1. Alter the No-Action Alternative to fence only the EMUA portion of the recipient area in the western portion of the WEA, and translocate desert tortoises to only this smaller fenced area outside the Means Lake Shared Use Area.

4.2.2.2 Land Ownership Status

The No-Action Alternative would not result in any change in land ownership status. Recipient areas are primarily located on the Combat Center or on public lands administered by the BLM. The desert tortoises that would be released on public lands would be in areas that currently support desert tortoise populations, so no additional land use restrictions would be required due to translocation of tortoises. Therefore, no land use impacts associated with ownership status under the No-Action Alternative would occur.

4.2.2.3 Specific Land Uses

Recreation and Off-Highway Vehicle Use

As shown in Figure 4.2-1, the Johnson Valley OHV Recreation Area overlaps a very small portion of one of the proposed recipient areas under the No-Action Alternative (situated to the northwest of the WEA at the northeast end of the OHV Area). This small overlap would only impact recreation in the OHV Area if that portion of the recipient area were ultimately selected for release or dispersal of translocated tortoises and if it was fenced accordingly to separate tortoises from OHV participants. However, this portion of the recipient area would not satisfy selection criteria described in the 2011 GTP (MCAGCC 2011) and would not be used for release of desert tortoises. Therefore, there would be no impact to recreation and OHV use at this location.

As discussed above in Section 4.2.2.1, the proposed desert tortoise exclusion fence that would surround the recipient area in the western portion of the WEA would prevent OHV access to 2,764 acres (1,082 ha) that are part of the Means Lake (Shared Use Area) Training Area. When this area is open to the public for 10 months of the year, it should be an “open area” where OHV use is not restricted to specific trails. This proposed fence would result in a significant impact to recreation in this area by preventing access to OHV use in this “open area.” Potential mitigation measure LU-1 could eliminate this potentially significant impact.

No other OHV use would be affected by the No-Action Alternative. Potential recreation impacts within designated conservation areas and wilderness areas are addressed below in the relevant subsections.

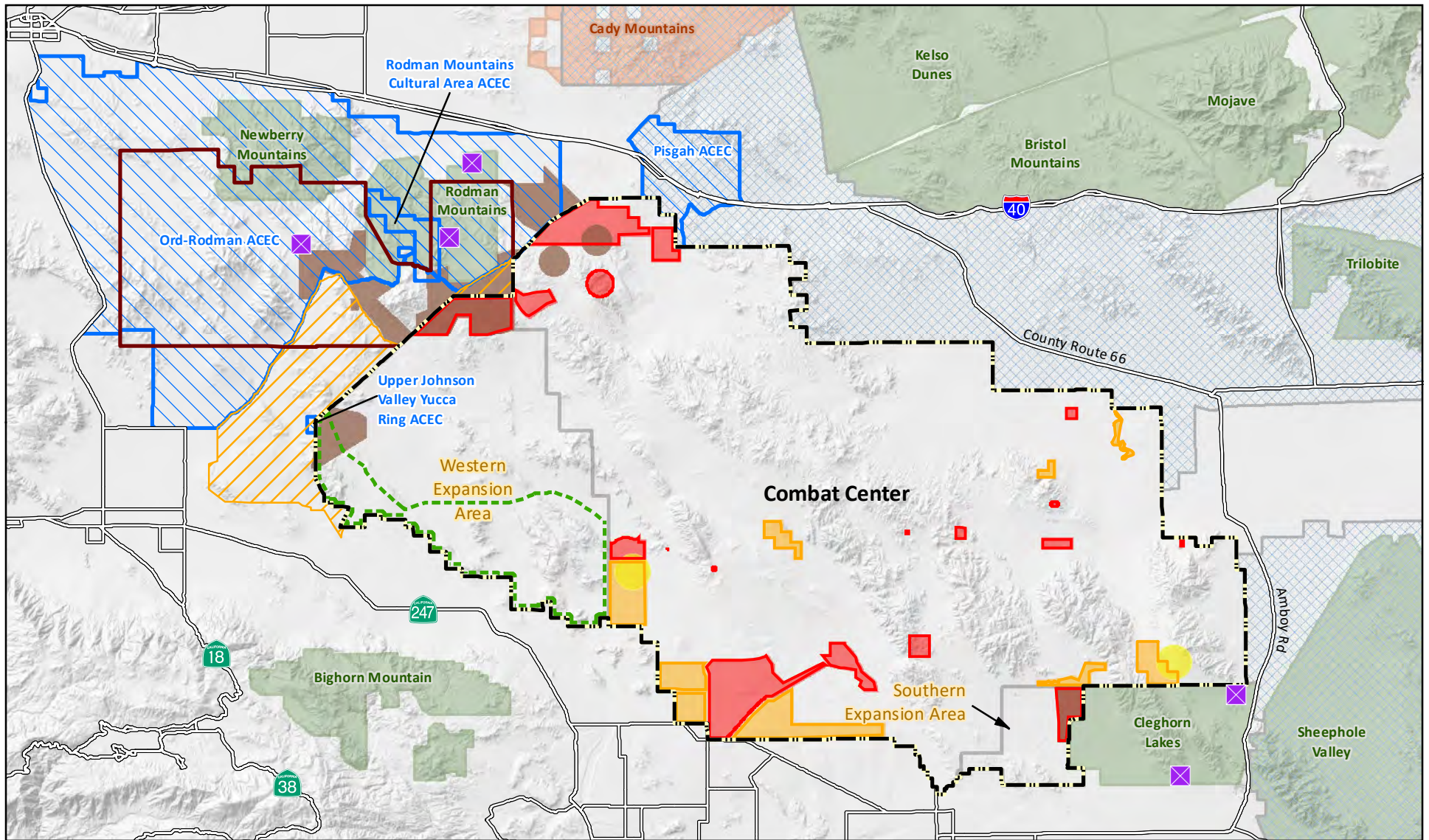
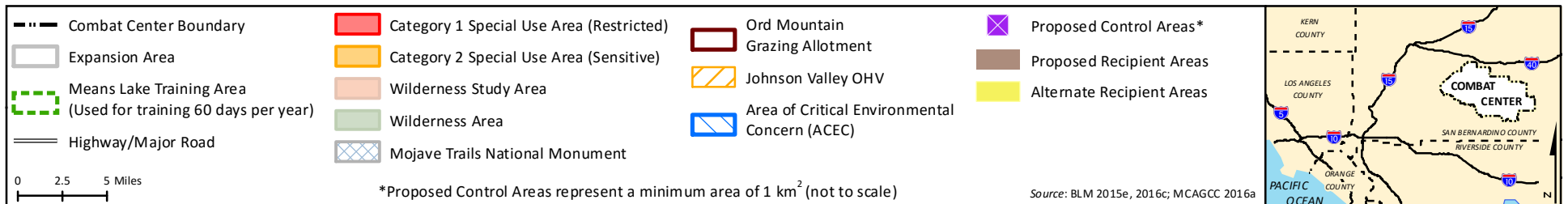


Figure 4.2-1. Specific Land Uses in the Vicinity of the No-Action Alternative



Grazing

The Ord-Rodman recipient areas and two control areas are located within the active Ord Mountain Grazing Allotment (cattle) (see Figure 4.2-1). Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment for continued cattle grazing. The dry matter consumed annually by an adult desert tortoise is 2.4 kilograms (Henen 1997). Given the number of tortoises estimated to disperse into the Ord Mountain Grazing Allotment under the No-Action Alternative, the total dry matter consumption by translocated tortoises would be less than the equivalent consumption by a single cow (Warrington 2001).

Translocated tortoises would have individual identification marks. If these tortoises are taken (injured or killed) as a result of authorized grazing operations, that take would be considered an impact associated with translocation. As such, these impacts would be covered by this SEIS and associated section 7 consultation.

Land use impacts related to incompatibility with grazing are considered to be less than significant because the continued grazing of cattle on the Ord Mountain Allotment would still be possible.

Conservation Areas

Recipient/control areas and associated translocation activities under the No-Action Alternative would be located within portions of the Ord-Rodman ACEC and the Rodman Mountains Cultural Area ACEC, but would not be located within the Mojave Trails National Monument (see Figure 4.2-1). Per SCM #5.3 (Section 2.6.1), vehicle traffic on BLM-managed lands would be limited to routes that have been designated “open” (signed) by BLM. New access roads or cross-country vehicle travel would not be permitted. Based on the above, implementation of the No-Action Alternative is expected to result in less than significant impacts to conservation areas. No further mitigation to reduce such impacts has been identified.

Wilderness Areas

Project activities proposed within wilderness areas under the No-Action Alternative would include designation of control areas only (no recipient areas). Periodic visits by Authorized Biologists to any control areas established within wilderness areas, for the purpose of conducting tortoise health assessment activities would occur on foot only and in such a way as to minimize ground disturbance. Such activities would not conflict with management goals and resource values associated with wilderness areas and would be consistent with Wilderness Act management goals by contributing to the ecological, scientific, and educational value of the affected wilderness areas. Fencing would only be constructed on Combat Center land outside the boundary of the Cleghorn Lakes Wilderness Area, around the constrained dispersal plot and along the adjacent Special Use Area.

Under the No-Action Alternative, two control areas are proposed in the Rodman Mountains Wilderness Area and two others would be placed in the Cleghorn Lakes Wilderness Area. Each of these areas would be a minimum of 0.39 square mile (1 km²) in size. Special conservation measures described in Section 2.6 would be applied as part of the proposed action. Four SCMs that are particularly relevant to minimizing project impacts in wilderness areas include: SCM #11 (requiring a BLM Minimum Requirements Analysis); SCM #12 (stipulating placement of staging areas outside wilderness area boundaries, foot traffic only within area boundaries, and varying ingress and egress routes to minimize formation of trails); SCM #13 (requiring use of colored fence posts to minimize the visual impact of any fences constructed outside of but near wilderness area boundaries); and SCM #14 (not installing transmitters on desert tortoises in wilderness areas or wilderness study areas).

The temporary tortoise exclusion fencing proposed around controlled dispersal areas to the west of the Cleghorn Lakes Wilderness Area would have a visually consistent and common design found throughout the area. The associated maintenance road on the Combat Center would also be visually consistent with other roads in the area.

The installation of transmitters on tortoises in wilderness areas or wilderness study areas would be a prohibited use under the Wilderness Act. However, this would not occur with implementation of SCM #14 and the Marine Corps would employ alternate methods (e.g., transects or mark-recapture plots) agreed to by USFWS to monitor tortoise populations in these areas. Therefore, none of the activities proposed in the wilderness areas are prohibited under Section 4(c) of the Wilderness Act, and none of these activities would adversely affect characteristics of wilderness areas, as defined in Section 2(c) of the Wilderness Act and summarized in Section 3.2.4.2.

Based on the considerations above, the No-Action Alternative is expected to result in less than significant impacts to wilderness areas. No additional mitigation measures have been identified to further reduce such impacts.

4.2.3 Alternative 1 Impacts

4.2.3.1 Plans and Policies

The use of recipient and control sites under Alternative 1 would be consistent with existing plans and policies, including the Combat Center's INRMP, San Bernardino County General Plan, CDCA Plan, West Mojave Plan, the Mojave Trails National Monument Management Plan (currently under development by the BLM), and Johnson Valley OHV Management Plan. The proposed fencing would be along the borders of the Combat Center or Special Use Areas. Fencing the Special Use Areas to prevent OHV vehicles from entering the Special Use Areas is consistent with the restricted access designated for these areas. In addition, tortoise exclusion fencing that would prevent desert tortoises from entering high- or medium-impact areas would be consistent with protection goals identified in the INRMP that would be updated to account for new training in the WEA and SEA. Therefore, impacts to plans and policies under Alternative 1 would be less than significant.

4.2.3.2 Land Ownership Status

The land uses and associated ownership (jurisdiction) of the recipient and control sites under Alternative 1 is provided in Table 2.2-2. Use of recipient and control sites would not result in changes to land ownership status; therefore, no land use impacts associated with land ownership status under Alternative 1 would occur.

4.2.3.3 Specific Land Uses

Recreation and Off-Highway Vehicle Use

The translocation of desert tortoises and post-translocation monitoring at recipient and control sites would not affect recreation in designated recreation areas (Figure 4.2-2). There would be no recipient sites and only one control site (Rodman-Sunshine Peak South) located in the Johnson Valley OHV Recreation Area. The post-translocation monitoring in the Rodman-Sunshine Peak South control site would not affect recreation with the Johnson Valley OHV Recreation Area. Therefore, impacts to recreation and OHV use under Alternative 1 would be less than significant. Potential recreation impacts within designated conservation areas and wilderness areas are addressed below in the relevant subsections.

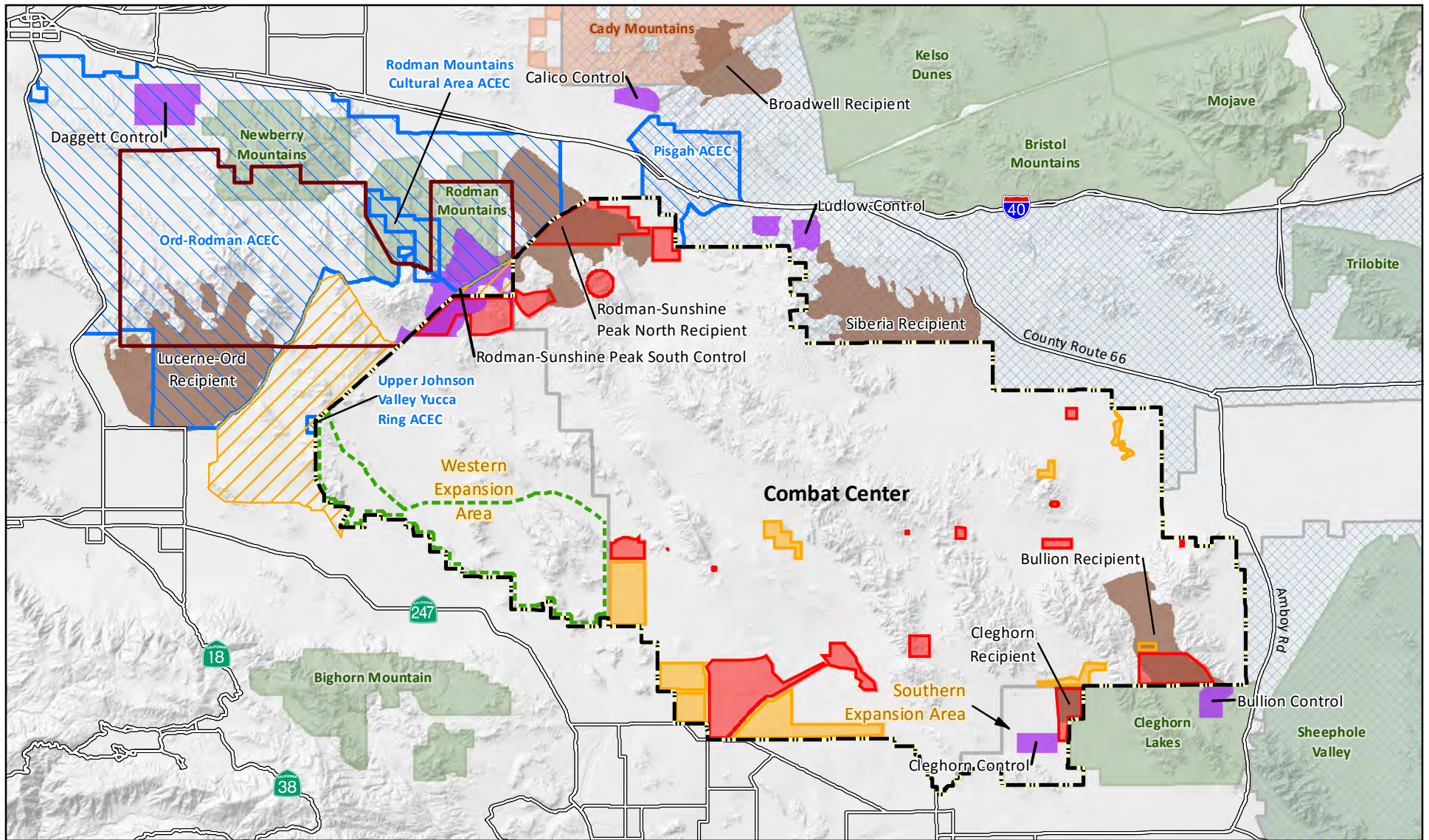
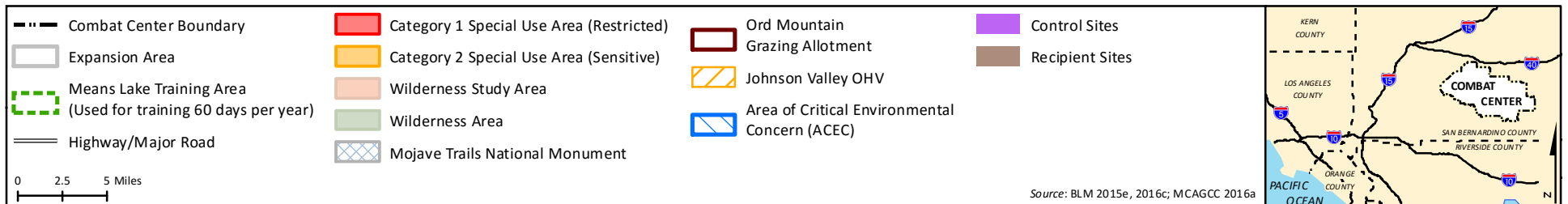


Figure 4.2-2. Specific Land Uses in the Vicinity of Alternative 1



Grazing

The Lucerne-Ord and Rodman-Sunshine Peak North recipient sites and the Rodman-Sunshine Peak South control site are partially located within the active Ord Mountain Grazing Allotment (cattle) (see Figure 4.2-2). Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment for continued cattle grazing. Given the number of tortoises estimated to disperse into the Ord Mountain Grazing Allotment under Alternative 1, the total dry matter consumption by translocated tortoises would be less than the equivalent consumption of a single cow (Warrington 2001).

Translocated tortoises would have individual identification marks. If these tortoises are taken (injured or killed) as a result of authorized grazing operations, that take would be considered an impact associated with translocation. As such, these impacts would be covered by this SEIS and associated section 7 consultation.

Land use impacts related to incompatibility with grazing are considered to be less than significant because the continued grazing of cattle on the Ord Mountain Grazing Allotment would be possible.

Conservation Areas

Recipient and control sites under Alternative 1 would be located within or adjacent to several ACECs, a portion of the Mojave Trails National Monument, and within Category 1 Special Use Areas or Training Areas on the Combat Center (see Figure 4.2-2). As discussed in Section 2.2.1.1, *Recipient Site Selection Criteria*, recipient sites were selected with consideration to protection and management already provided for these conservation areas. The March Translocation Plan (Appendix A) was developed through consultation with the BLM and USFWS to ensure consistency with management plans and protections afforded to these conservation areas. Specifically, the Rodman-Sunshine Peak North recipient site was configured to avoid dispersal of desert tortoises into the Rodman Mountains Wilderness Area, per BLM guidance, and provide at least a 4 mile (6.5 km) distance from the MEB northern battalion route (MCAGCC 2016b).

The use of helicopters to translocate tortoises under this alternative has the potential to affect land uses on public lands near the helicopter landing areas and below the flight track of each helicopter. However, noise associated with helicopter use would be minimal and temporary, occurring over a 10- to 12-day period with an anticipated 40 to 50 total helicopter trips (4 trips per day). While these trips would represent a small increase on BLM lands, impacts associated with noise would be less than significant. On Combat Center lands, the increase in air traffic would be negligible relative to the approximately 59,000 annual aircraft sorties conducted at the Combat Center. Helicopters would only land on existing roads that have been designated “open” by the BLM (with signs), outside of the wilderness areas.

Tortoise translocation activities would be coordinated with the BLM, to ensure that such activities would be consistent with the management plans for affected ACECs and with the principles and preservation goals that stimulated designation of the Mojave Trails National Monument in February 2016. Although a management plan for the National Monument is under development, the proposed action under Alternative 1 would be consistent with the purpose and objectives stated in the founding proclamation, especially with regard to the importance of furthering ecological research related to ecological communities and wildlife, ecological connectivity in the Mojave Desert region, and preservation of the area’s diverse array of natural and scientific resources. None of the proposed tortoise translocation efforts would directly or indirectly conflict with the stated objectives or underlying purpose for designating the National Monument. In addition, because desert tortoise populations within the National Monument are depressed relative to historic numbers, the augmentation of these populations through translocation could

benefit the objective of maintaining these species in the National Monument. Access to the project areas that would overlap the National Monument would be consistent with limitations on road and motorized vehicle use. Therefore, impacts to conservation areas, including the new Mohave Trails National Monument, would be less than significant under Alternative 1.

Wilderness Areas

Project activities proposed within wilderness areas under Alternative 1 would include dispersal of translocated tortoises from the Broadwell recipient site into the Cady Mountains Wilderness Study Area; designation of a control site in the Rodman Mountains Wilderness Area; designation of a control site in the Cleghorn Lakes Wilderness Area; and construction of fencing near the Cleghorn Lakes Wilderness Area. Periodic visits by Authorized Biologists within such areas to conduct monitoring and tortoise health assessment activities would occur on foot only and in such a way as to minimize ground disturbance. Such activities would not conflict with management goals and resource values associated with wilderness areas, and would be consistent with Wilderness Act management goals by contributing to the ecological, scientific, and educational values for which such areas were designated. Fencing would only be constructed on Combat Center land outside the northern and western boundaries of the Cleghorn Lakes Wilderness Area.

Under Alternative 1, SCMs described in Section 2.6 would be applied as part of the proposed action. Three SCMs that are particularly relevant to minimizing project impacts in wilderness areas include: SCM #11 (requiring a BLM Minimum Requirements Analysis); SCM #12 (stipulating placement of staging areas outside wilderness area boundaries, foot traffic only within area boundaries, and varying ingress and egress routes to minimize development of trails); SCM #13 (requiring use of colored fence posts for any fences constructed outside of but near wilderness area boundaries); and SCM #14 (not installing transmitters on desert tortoises in wilderness areas or wilderness study areas).

The tortoise exclusion fencing proposed in Alternative 1 would be approximately 4 ft (1.3 m) high and made of 18 inch (45.7 cm) high, 1 by 2 inch (2.5 x 5 cm) mesh topped by three strands of smooth wire, which is a visually consistent and common design found throughout the area. Such fencing would help to prevent or minimize unauthorized incursions into the Cleghorn Lakes Wilderness Area. The associated maintenance road on the Combat Center would also be visually consistent with other roads in the area.

The installation of transmitters on tortoises in wilderness areas or wilderness study areas would be a prohibited use under the Wilderness Act. However, this would not occur with implementation of SCM #14 and the Marine Corps would employ alternate methods (e.g., transects or mark-recapture plots) agreed to by USFWS to monitor tortoise populations in these areas. Therefore, none of the activities proposed in the wilderness areas are prohibited under Section 4(c) of the Wilderness Act, and none of these activities would adversely affect characteristics of the wilderness areas, as defined in Section 2(c) of the Wilderness Act and summarized in Section 3.2.4.2.

Based on the considerations above, Alternative 1 is expected to result in less than significant impacts to wilderness areas. No additional mitigation measures have been identified to further reduce such impacts.

4.2.3.4 Potential Mitigation Measures

No significant impacts to land use have been identified under Alternative 1. Besides the SCMs discussed in Section 2.6, no additional mitigation measures have been identified for Alternative 1.

4.2.4 Alternative 2 (Preferred Alternative) Impacts

Land use impacts under Alternative 2 would be similar to those under Alternative 1. One difference between Alternative 1 and 2 that could affect land use is that under Alternative 2 the Bullion recipient site would not be established and the Bullion control site would be located on the Combat Center instead of within the Cleghorn Lakes Wilderness Area (Figure 4.2-3). This would remove a control site from BLM-administered wilderness area. A second difference between these alternatives is a small increase in the number of tortoises estimated to be translocated into the Ord Mountain Grazing Allotment.

4.2.4.1 Plans and Policies

The use of recipient and control sites under Alternative 2 would be consistent with existing plans and policies, including the Combat Center's INRMP, San Bernardino County General Plan, CDCA Plan, West Mojave Plan, the Mojave Trails National Monument Management Plan (currently under development by the BLM), and Johnson Valley OHV Management Plan. The proposed fencing would be along the borders of the Combat Center or Special Use Areas. Fencing the Special Use Areas to prevent OHV vehicles from entering the Special Use Areas is consistent with the restricted access designated for these areas. In addition, tortoise exclusion fencing that would prevent desert tortoises from entering high- or medium-impact areas would be consistent with protection goals identified in the INRMP that would be updated to account for new training in the WEA and SEA. Therefore, impacts to plans and policies under Alternative 2 would be less than significant.

4.2.4.2 Land Ownership Status

The land uses and associated ownership (jurisdiction) of the recipient and control sites under Alternative 2 is provided in Table 2.2-2. Use of recipient and control sites would not result in changes to land ownership status; therefore, no land use impacts associated with land ownership status under Alternative 2 would occur.

4.2.4.3 Specific Land Uses

Recreation and Off-Highway Vehicle Use

The translocation of desert tortoises and post-translocation monitoring at recipient and control sites would not affect recreation in designated recreation areas (see Figure 4.2-2). There would be no recipient sites and only one control site (Rodman-Sunshine Peak South) located in the Johnson Valley OHV Recreation Area. The post-translocation monitoring in the Rodman-Sunshine Peak South control site would not affect recreation with the Johnson Valley OHV Recreation Area. Therefore, impacts to recreation and OHV use under Alternative 2 would be less than significant.

Grazing

The Lucerne-Ord and Rodman-Sunshine Peak North recipient sites and the Rodman-Sunshine Peak South control site are partially located within the active Ord Mountain Grazing Allotment (cattle) (see Figure 4.2-2). Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment for continued cattle grazing. Given the number of tortoises estimated to disperse into the Ord Mountain Grazing Allotment under Alternative 2, the total dry matter consumption by translocated tortoises would be less than the equivalent consumption of a single cow (Warrington 2001).

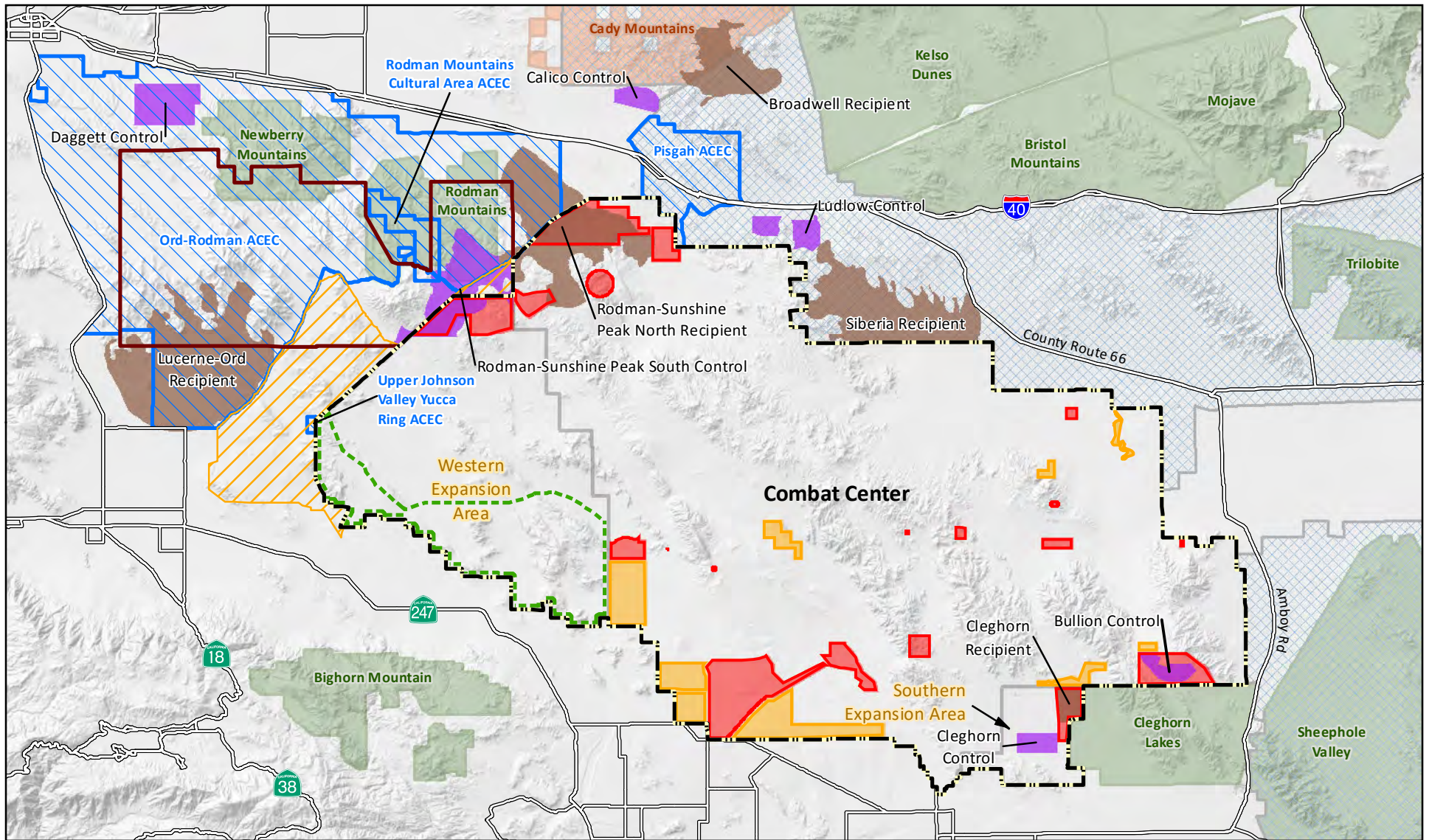
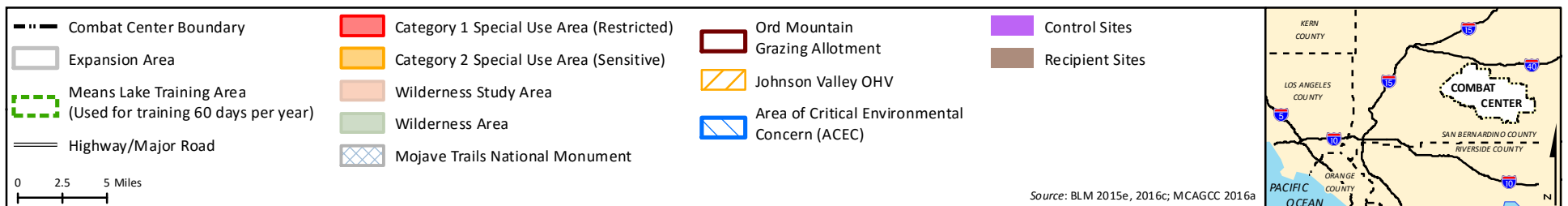


Figure 4.2-3. Specific Land Uses in the Vicinity of Alternative 2



Translocated tortoises would have individual identification marks. If these tortoises are taken (injured or killed) as a result of authorized grazing operations, that take would be considered an impact associated with translocation. As such, these impacts would be covered by this SEIS and associated section 7 consultation.

Land use impacts related to incompatibility with grazing are considered to be less than significant because the continued grazing of cattle on the Ord Mountain Grazing Allotment would be possible.

Conservation Areas

While the number of tortoises that would be translocated into the Mojave Trails National Monument would change under this alternative, tortoises remain a natural part of the landscape and this would not affect the purpose of establishing the National Monument. In addition, because desert tortoise populations within the National Monument are depressed relative to historic numbers, the augmentation of these populations through translocation could benefit the objective of maintaining these species in the National Monument.

Wilderness Areas

Project activities proposed within wilderness areas under Alternative 2 would include dispersal of translocated tortoises from the Broadwell recipient site into the Cady Mountains Wilderness Study Area, designation of a control site in the Rodman Mountains Wilderness Area, and construction of fencing near the Cleghorn Lakes Wilderness Area. The periodic visits by Authorized Biologists for purposes of conducting tortoise monitoring and health assessments within such areas would occur on foot only and in such a way as to minimize ground disturbance. Such activities would not conflict with management goals and resource values associated with wilderness areas, and would be consistent with Wilderness Act management goals by contributing to the ecological, scientific, and educational value of these areas. Fencing would only be constructed on Combat Center land near the western boundary of the Cleghorn Lakes Wilderness Area.

As a result of the Bullion recipient site being eliminated in Alternative 2, the Bullion control site would be moved from the Cleghorn Lakes Wilderness Area into the Bullion Training Area. With this realignment, Alternative 2 represents the minimum requirement for use of wilderness areas while still meeting the purpose and need for the proposed action.

Under Alternative 2, SCMs described in Section 2.6 would be applied as part of the proposed action. Three SCMs that are particularly relevant to minimizing project impacts in wilderness areas include: SCM #11 (requiring a BLM Minimum Requirements Analysis); SCM #12 (stipulating placement of staging areas outside wilderness area boundaries, foot traffic only within area boundaries, and varying ingress and egress routes to minimize development of trails); SCM #13 (requiring use of colored fence posts for any fences constructed outside of but near wilderness area boundaries); and SCM #14 (not installing transmitters on desert tortoises in wilderness areas or wilderness study areas).

The tortoise exclusion fencing proposed in Alternative 2 would be approximately 4 ft (1.3 m) high and made of 18 inch (45.7 cm) high, 1 by 2 inch (2.5 x 5 cm) mesh topped by three strands of smooth wire, which is a visually consistent and common design found throughout the area. Such fencing would help to prevent or minimize unauthorized incursions into the Cleghorn Lakes Wilderness Area. The associated maintenance road on the Combat Center side of the fence would also be visually consistent with other roads in the area.

The installation of transmitters on tortoises in wilderness areas or wilderness study areas would be a prohibited use under the Wilderness Act. However, this would not occur with implementation of SCM #14 and the Marine Corps would employ alternate methods (e.g., transects or mark-recapture plots) agreed to by USFWS to monitor tortoise populations in these areas. Therefore, none of the activities proposed in the wilderness areas are prohibited under Section 4(c) of the Wilderness Act, and none of them would adversely affect characteristics of these wilderness areas, as defined in Section 2(c) of the Wilderness Act and summarized in Section 3.2.4.2.

Based on the considerations above, Alternative 2 is expected to result in less than significant impacts to wilderness areas. No additional mitigation measures have been identified to further reduce such impacts.

4.2.4.4 Potential Mitigation Measures

No significant impacts to land use have been identified under Alternative 2. Therefore, other than the SCMs discussed in Section 2.6, no additional mitigation measures are identified for Alternative 2.

4.2.5 Summary of Impacts – Land Use

With the exception of a significant but mitigable (SI-M) impact associated with both Plans/Policies and Recreation under the No-Action Alternative, the land use impacts that would result from the construction and operation of the proposed action would be less than significant for all alternatives. Table 4.2-1 provides a summary of impacts for each alternative.

Table 4.2-1. Summary of Impacts for Land Use

Alternative	Impacts
No-Action Alternative	<p>SI-M <u>Plans and Policies</u></p> <ul style="list-style-type: none"> Significant but mitigable impact because fencing of the proposed recipient area along the western boundary of the WEA would remove OHV access to a portion of the Means Lake Shared Use Area. This would be inconsistent with the intent of the 2014 NDAA and the Johnson Valley OHV Area Management Plan. <ul style="list-style-type: none"> Potential Mitigation: LU-1, Alter the No-Action Alternative to fence only the EMUA portion of the recipient area in the western portion of the WEA, and translocate desert tortoises to only this smaller fenced area outside the Means Lake Shared Use Area. <p><u>Recreation and OHV Use</u></p> <ul style="list-style-type: none"> Same SI-M impact as described above for Plans and Policies, because fencing of the WEA recipient area in the Means Lake Shared Use Area would prevent access to an “open use” OHV area. <ul style="list-style-type: none"> Potential Mitigation: LU-1, Alter the No-Action Alternative to fence only the EMUA portion of the recipient area in the western portion of the WEA, and translocate desert tortoises to only this smaller fenced area outside the Means Lake Shared Use Area. <p>LSI <u>Plans and Policies</u></p> <ul style="list-style-type: none"> Use of most recipient and control areas would be consistent with existing plans and policies, including the Combat Center’s INRMP, the 2014 NDAA, San Bernardino County General Plan, CDCA Plan, and West Mojave Plan. <p><u>Land Ownership Status</u></p> <ul style="list-style-type: none"> Changes in land ownership status would not occur.

Table 4.2-1. Summary of Impacts for Land Use (continued)

Alternative	Impacts
No-Action Alternative (continued)	<p><u>Grazing</u></p> <ul style="list-style-type: none"> Land use impacts associated with incompatibility with grazing allotments would be less than significant because grazing of cattle would continue to occur and the total dry matter consumption by translocated tortoises would be less than the equivalent consumption of a single cow. <p><u>Conservation Areas</u></p> <ul style="list-style-type: none"> Vehicle traffic on BLM-managed lands would be limited to routes that have been designated “open” by BLM. No new roads or cross-country vehicle travel are proposed. Project activities within conservation areas would be compatible with the purposes and management of such areas. <p><u>Wilderness Areas</u></p> <p>Only control areas are proposed in wilderness areas (no tortoise recipient areas). Fencing would be on Combat Center land outside one wilderness area. With the implementation of SCMs described in Section 2.6, all project activities within wilderness areas would be consistent with wilderness management goals, characteristics, and values, so the No-Action Alternative is expected to result in less than significant impacts to wilderness areas.</p>
Alternative 1	<p>LSI</p> <p><u>Plans and Policies</u></p> <ul style="list-style-type: none"> Use of recipient and control sites would be consistent with existing plans and policies, including the Combat Center’s INRMP, San Bernardino County General Plan, CDCA Plan, West Mojave Plan, and Johnson Valley OHV Management Plan. <p><u>Land Ownership Status</u></p> <ul style="list-style-type: none"> Changes in land ownership status would not occur. <p><u>Recreation and OHV Use</u></p> <ul style="list-style-type: none"> The translocation of desert tortoises and post-translocation monitoring at recipient and control sites would not affect recreation in designated areas such as the Johnson Valley OHV Recreation Area. <p><u>Grazing</u></p> <ul style="list-style-type: none"> Impacts related to grazing under Alternative 1 would be the same as for the No-Action Alternative. <p><u>Conservation Areas</u></p> <ul style="list-style-type: none"> The use of helicopters to translocate tortoises would result in negligible noise impacts and helicopters would only land on existing roads, outside of sensitive areas. The plan for translocation of desert tortoises was coordinated with the BLM to ensure that translocation and monitoring is consistent with the management plans for the ACECs and the Mojave Trails National Monument. <p><u>Wilderness Areas</u></p> <ul style="list-style-type: none"> Under Alternative 1, SCMs described in Section 2.6 would be applied as part of the proposed action and would include a BLM Minimum Requirements Analysis; placing staging areas outside wilderness areas; and varying foot traffic ingress and egress routes to minimize development of trails. Fencing would be on Combat Center land outside one wilderness area. All project activities within wilderness areas would be consistent with wilderness management goals, characteristics, and values, so Alternative 1 is expected to result in less than significant impacts to wilderness areas.
Alternative 2	<p>LSI</p> <ul style="list-style-type: none"> Impacts would be essentially the same as described above for Alternative 1.

Legend: ACEC = Area of Critical Environmental Concern; BLM = Bureau of Land Management; CDCA = California Desert Conservation Area; INRMP = Integrated Natural Resources Management Plan; LSI = Less Than Significant Impact; NDAA = National Defense Authorization Act; OHV = Off-Highway Vehicle; SI = Significant Impact; SI-M = Significant Impacts Mitigable to Less Than Significant; WEA = Western Expansion Area.

4.3 AIR QUALITY

4.3.1 Approach to Analysis

The air quality analysis estimated the magnitude of emissions that would occur from proposed construction and operational activities for each alternative. Construction related activities would include the installation of temporary and permanent fencing in the translocation areas within the WEA and SEA, and helicopter and/or truck trips to translocate the tortoises. The analysis compared emissions from proposed construction and operations to the criteria identified below in Section 4.3.1.2 to determine their significance. The potential for proposed emissions to exceed a national ambient air quality standard was evaluated on the basis of how these emissions would affect public lands outside of the Combat Center boundary. The analysis also evaluated how proposed emissions would affect air quality within the Joshua Tree National Park, which is the nearest federal Class I area to the Combat Center. The nearest border of this area to proposed activities is approximately 10 miles (16 km) to the south-southwest.

4.3.1.1 Methodology

Construction of Exclusion Fencing and Tortoise Translocation

Air quality impacts from construction activities proposed under each project alternative would occur from (1) combustive emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM₁₀ and PM_{2.5}) due to the operation of equipment on exposed soil.

Potential air quality emissions were estimated using the *California Emissions Estimator Model* (CalEEMod), which is the current air quality model for land use projects in California. CalEEMod was developed through a collaboration between air districts within California, and includes default data (such as emissions factors, source inventory, trip lengths, and meteorology) that account for local requirements. Appendix D contains data and assumptions used to calculate emissions from proposed construction.

Post-translocation Activities

Air quality impacts associated with proposed operational activities under each project alternative would occur from (1) combustive emissions due to the use of fossil fuel-powered vehicles and equipment for tortoise monitoring and fencing maintenance/repair, and (2) fugitive dust emissions (PM₁₀/PM_{2.5}) due to the operation of vehicles and equipment on exposed soil on MSRs and the 16 ft (5 m) wide road established along fencing and signs (see Section 2.2.2.2, *Fencing*).

4.3.1.2 Evaluation Criteria

For the purposes of this air quality analysis, and for air pollutants designated as nonattainment with the NAAQS and therefore subject to general conformity requirements, if the estimated total of direct and indirect emissions caused by a project alternative exceed a conformity *de minimis* threshold requiring a conformity determination in the MDAB project region (25 tons per year of VOCs or NO_x, or 100 tons per year of PM₁₀), further analysis was conducted to determine whether impacts were significant. In such cases, if emissions conform to the approved SIP, then proposed impacts would be determined to be less than significant.

For those air pollutants in MDAB which are in attainment of the NAAQS (CO, SO₂, and PM_{2.5}), the general conformity requirements and thresholds do not apply. For these air pollutants, the analysis used thresholds from the USEPA Prevention of Significant Deterioration (PSD) permitting program that define major stationary sources of emissions as the evaluation criteria for determining the potential for significance of air quality impacts for the project alternatives. Although the PSD permitting program is

not applicable to mobile sources, PSD thresholds are being used as criteria for measuring air quality impacts under NEPA.

4.3.2 No-Action Alternative Impacts

4.3.2.1 Construction of Exclusion Fencing and Tortoise Translocation

The following provides an estimate of the emissions that would occur from the construction of tortoise exclusion fencing. Table 4.3-1 summarizes the total emissions that would occur from construction activities proposed under the No-Action Alternative. The project schedule estimates that construction activities would occur in early 2017, and would take approximately 2 months to construct the fencing and relocate the tortoises.

Table 4.3-1. Total Emissions Resulting from Implementation of the No-Action Alternative

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO _x	Emissions (tons/year) CO	Emissions (tons/year) SO ₂	Emissions (tons/year) PM ₁₀	Emissions (tons/year) PM _{2.5}
Construction Emissions	0.0704	0.7625	0.4043	0.0011	0.1116	0.0381
Total Emissions (tons/year)	0.0704	0.7625	0.4043	0.0011	0.1116	0.0381
Conformity <i>de minimis</i> Limits	25	25	NA	NA	100	NA
Exceeds Conformity <i>de minimis</i> Limits?	No	No	No	No	No	No

Legend: CO = carbon monoxide; NA = Not Applicable; NO_x = nitrogen oxides; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; SO₂ = sulfur dioxide; VOCs= volatile organic compounds.

The MDAB is in attainment of the CO, SO₂, and PM_{2.5} NAAQS. In addition, when compared to the PSD threshold of 250 tons per year, the estimated construction emissions of all criteria pollutants (including those in attainment of the NAAQS) would be well below these levels. Therefore, with implementation of the SCMs identified in Section 2.6.4, less than significant impacts to air quality would occur with implementation of the No-Action Alternative.

4.3.2.2 Post-translocation Activities

Vehicles would travel to the recipient and control areas infrequently to monitor tortoises and inspect/repair fencing. Monitoring is scheduled to occur approximately 1 to 4 times per month at the 12 recipient sites annually. The approximately 320 vehicle trips to and from the recipient and control sites per year would generate a nominal amount of criteria pollutants and GHGs, during each of the 30 years while the monitoring would occur. Additionally, as discussed previously in Section 2.1.4.2, temporary fencing would be removed 2 years after the tortoises are translocated. Air quality emissions from these trips would be minor and would not significantly impact air quality. Therefore, with implementation of the SCMs identified in Section 2.6.4, less than significant impacts to air quality would occur with implementation of the No-Action Alternative.

4.3.2.3 Potential Mitigation Measures

No additional mitigation measures to reduce air quality impacts have been identified.

4.3.3 Alternative 1 Impacts

4.3.3.1 Construction of Exclusion Fencing and Tortoise Translocation

The following provides an estimate of the emissions that would occur from tortoise exclusion fencing construction, road construction, and sign installation. Tortoises would be relocated by helicopter or car when the recipient site is too far to be hand-carried. Table 4.3-2 summarizes the total emissions that would occur from construction activities proposed under Alternative 1. The project schedule estimates that construction activities would occur in early 2017, and would take approximately 2 months to construct the fencing and relocate the tortoises.

Table 4.3-2. Total Emissions Resulting from Implementation of Alternative 1

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO _x	Emissions (tons/year) CO	Emissions (tons/year) SO ₂	Emissions (tons/year) PM ₁₀	Emissions (tons/year) PM _{2.5}
Construction Emissions	0.0704	0.7625	0.4043	0.0011	0.0729	0.0339
Helicopter Emissions	0.0002	0.0060	0.0031	NA	0.0050	NA
Total Emissions (tons/year)	0.0706	0.7685	0.4074	0.0011	0.0779	0.0339
Conformity <i>de minimis</i> Limits	25	25	NA	NA	100	NA
Exceeds Conformity <i>de minimis</i> Limits?	No	No	No	No	No	No

Legend: CO = carbon monoxide; NA = Not Applicable; NO_x = nitrogen oxides; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; SO₂ = sulfur dioxide; VOCs = volatile organic compounds.

The data in Table 4.3-2 show that criteria pollutant emissions from proposed construction activities would not exceed the conformity *de minimis* thresholds. The MDAB is in attainment of the CO, SO₂, and PM_{2.5} NAAQS. In addition, when compared to the PSD threshold of 250 tons per year, the estimated construction emissions of all criteria pollutants (including those in attainment of the NAAQS) would be well below these levels. Therefore, with implementation of the SCMs identified in Section 2.6.4, less than significant impacts to air quality would occur with implementation of Alternative 1.

4.3.3.2 Post-translocation Activities

Operations would be the same as described for the No-Action Alternative, above. Therefore, with implementation of the SCMs identified in Section 2.6.4, less than significant impacts to air quality would occur with implementation of Alternative 1.

4.3.3.3 Potential Mitigation Measures

No additional mitigation measures to reduce air quality impacts have been identified.

4.3.4 Alternative 2 (Preferred Alternative) Impacts

4.3.4.1 Construction of Exclusion Fencing and Tortoise Translocation

Construction activities proposed under Alternative 2 would be similar to Alternative 1, with the exception that fencing at the Bullion recipient site would not be constructed since the Bullion recipient site would not be used under Alternative 2. Table 4.3-3 summarizes the total emissions that would occur from construction activities proposed under Alternative 2.

Table 4.3-3. Total Emissions Resulting from Implementation of Alternative 2

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO _x	Emissions (tons/year) CO	Emissions (tons/year) SO ₂	Emissions (tons/year) PM ₁₀	Emissions (tons/year) PM _{2.5}
Construction Emissions	0.0704	0.7625	0.4043	0.0011	0.0687	0.0335
Helicopter Emissions	0.0002	0.0060	0.0031	NA	0.0050	NA
Total Emissions (tons/year)	0.0706	0.7685	0.4074	0.0011	0.0737	0.0335
Conformity <i>de minimis</i> Limits	25	25	NA	NA	100	NA
Exceeds Conformity <i>de minimis</i> Limits?	No	No	No	No	No	No

Legend: CO = carbon monoxide; NA = Not Applicable; NO_x = nitrogen oxides; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; SO₂ = sulfur dioxide; VOCs = volatile organic compounds.

The data in Table 4.3-3 show that criteria pollutant emissions from proposed construction activities would not exceed the conformity *de minimis* thresholds. The MDAB is in attainment of the CO, SO₂, and PM_{2.5} NAAQS. In addition, when compared to the PSD threshold of 250 tons per year, the estimated construction emissions of all criteria pollutants (including those in attainment of the NAAQS) would be well below these levels. Therefore, with implementation of the SCMs identified in Section 2.6.4, less than significant impacts to air quality would occur with implementation of Alternative 2.

4.3.4.2 Post-translocation Activities

Operations would be the same as described for the No-Action Alternative and Alternative 1, above. Therefore, with implementation of the SCMs identified in Section 2.6.4, less than significant impacts to air quality would occur with implementation of Alternative 2.

4.3.4.3 Potential Mitigation Measures

No additional mitigation measures to reduce air quality impacts have been identified.

4.3.5 Summary of Impacts – Air Quality

Impacts related to air quality that would occur from the construction and operation of the Proposed Project would be less than significant for all alternatives. Table 4.3-4 provides a summary of impacts for each alternative.

Table 4.3-4. Summary of Impacts for Air Quality

Alternative	Impacts
No-Action Alternative	LSI <ul style="list-style-type: none"> Estimated construction and operation emissions of all criteria pollutants would be below conformity <i>de minimis</i> limits. Therefore, impacts to air quality would be less than significant.
Alternative 1	LSI <ul style="list-style-type: none"> Impacts would be similar to the No-Action Alternative, and therefore would be less than significant.
Alternative 2	LSI <ul style="list-style-type: none"> Impacts would be similar to the No-Action Alternative, and therefore would be less than significant.

Legend: LSI = Less Than Significant Impact

4.4 CULTURAL RESOURCES

4.4.1 Approach to Analysis

4.4.1.1 Methodology

Under Section 106 of the NHPA, federal agencies are required to consider the effects of their undertakings on historic properties. If there would be an adverse effect, the agency must consult with the SHPO, affected Native American tribes or Native Hawaiian organizations, and other interested parties to consider methods to mitigate the impact. As noted in Section 3.4, while Section 106 of the NHPA is the primary mechanism used to evaluate impacts to those cultural resources that are historic properties, cultural resources include more than historic properties. Accordingly, this analysis will also look at impacts to cultural resources under NAGPRA, Archeological and Historic Preservation Act, Archaeological Resources Protection Act, and American Indian Religious Freedom Act, as appropriate.

The Programmatic Agreement Among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NCSHPO), Regarding the Manner in Which BLM Will Meet its Responsibilities Under the National Historic Preservation Act (NHPA), established guidelines by which the BLM will satisfy its requirements under NHPA. Under the NHPA, the ACHP has an advisory-consultative role in the BLM management process when a proposed project may have an effect on nationally significant cultural properties or when a project involves interstate and/or interagency coordination. A California State Protocol (signed in February 2014 to replace all previous agreements) between the California BLM and the California SHPO outlines the manner in which the two agencies will interact and cooperate under the NHPA. The California State Protocol legally replaces 36 CFR Part 800 as the procedural basis for the BLM to meet its responsibilities under Sections 106, 110(f), and 111(a) of the NHPA. For undertakings on Department of Defense lands, the procedures as outlined in 36 CFR Part 800 are followed to meet all NHPA Section 106 responsibilities.

4.4.1.2 Evaluation Criteria

Under the NHPA, any effect is measured by its impact upon the characteristics that qualify a property to be eligible for listing in the NRHP. Effects can be direct or indirect, but they constitute the physical, visual, or audible changes in the environment that could alter the character of a significant site.

According to 36 CFR Part 800.5a (2), there may be adverse effects upon a historic property when there is:

1. Destruction or alteration of all or part of a property,
2. Isolation from or alteration of the property's surrounding environment,
3. Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting,
4. Neglect of a property resulting in its deterioration or destruction, or
5. Transfer or sale of a property without adequate conditions or restrictions regarding preservation, maintenance, or use.

Several factors need to be considered to identify and compare the potential impact on historic properties in each alternative of the project. Avoiding NRHP eligible properties is preferred; however, it may not be possible to meet this goal. When comparing alternatives, determining the scope, type, and level of impact

to cultural resources eligible for listing in the NRHP is crucial. A findings determination will be made regarding these criteria which may require consultation with the SHPO under Section 106 of the NHPA.

All archaeological property types are vulnerable to direct impact. If ground disturbance occurs at a site, it would decrease the site's integrity and can greatly reduce the ability of the site's data to contribute to our knowledge of prehistory or history, thereby affecting the NRHP eligibility of the site. The vulnerability of a site to indirect impacts is determined by what degree the impact has to the aspects of setting, feeling, and association that contribute to the overall "recognizability" of the site's historical significance (Hardesty and Little 2000). For some sites, such as national trails and traditional cultural properties, significance may be directly tied to its setting and the feeling it conveys; therefore, vulnerability to indirect impacts might be considered high. In these cases, the "experience" of the site is just as important as its physical remains. Without one or the other, the character and feeling of the site is compromised and its eligibility for listing in the NRHP can be compromised.

For this SEIS, the analysis for historic property impacts is focused on specific actions related to the translocation of the desert tortoise—construction of fencing, signs, maintenance roads, and helicopter landings within release areas, and the potential effects of those actions on archaeological resources. No architectural resources or traditional cultural properties are known to be located in the APE for the No-Action Alternative, Alternative 1, or Alternative 2. The identification of such properties is an ongoing process identified in the Combat Center ICRMP (MAGTF Training Command 2011b).

With respect to the identification of the desert tortoise as part of the cultural and spiritual landscape for the Colorado River Indian Tribes, evaluation will focus on the extent to which translocation of tortoise would affect that landscape and the tortoise.

4.4.2 No-Action Alternative Impacts

4.4.2.1 Historic Properties

Construction of fencing would be required in several areas to prevent tortoises from moving into impact or recreation areas. Some of the proposed fencing locations have been previously surveyed for cultural resources.

In addition to the installation of fencing, a permanent maintenance road would be located along the fenceline on Combat Center land. As discussed in Section 2.6, *Special Conservation Measures*, an archaeological monitor would be present for all sign and post emplacement and for all trenching for desert tortoise exclusion fencing and the permanent maintenance road. The monitor would ensure that no signs, posts, trenches, or roads would be placed in a manner that would disturb any archaeological site or features. With the implementation of these SCMs, no direct or indirect impacts would occur to historic properties under the No-Action Alternative.

4.4.2.2 Cultural and Spiritual Landscape for the Colorado River Indian Tribes

The cultural landscape for the Colorado River Indian Tribes covers all of the lands within the Combat Center and the APE for the proposed action. Under the No Action alternative, relocation of desert tortoise would occur within this landscape, as the desire is to relocate tortoises to habitats comparable to their current locations in terms of vegetation, topography, climate, etc. All of the proposed recipient areas have previously hosted higher densities of desert tortoise than are present currently; movement of additional tortoise to these locations is thus consistent with historic levels of tortoise in these locations. Given the tortoises must be relocated from the medium- and high-intensity impact areas to avoid harm, the translocation effort benefits the long-term health of the tortoise population on the landscape compared

to leaving the tortoise in place. In addition, the ongoing monitoring of tortoises throughout the Combat Center, and the research efforts to increase the health of the tortoise population, all serve to benefit the tortoise population overall. Taken together, the actions outlined in the 2011 GTP (the No-Action Alternative) would have less than significant impacts on the desert tortoise as part of the cultural and spiritual landscape for the Colorado River Indian Tribes. The Combat Center will address the concerns of the Colorado River Indian Tribes as part of government-to-government consultation, as outlined in Department of Defense Instruction 4710.02.

4.4.2.3 Potential Mitigation Measures

No significant impacts to cultural resources have been identified under the No-Action Alternative. Therefore, except for the SCMs discussed in Section 2.6, no additional mitigation measures are identified for the No-Action Alternative.

4.4.3 Alternative 1 Impacts

4.4.3.1 Historic Properties

The Combat Center initiated Section 106 consultation with the California SHPO on January 25, 2016 (Luzier 2016) (see Appendix C). Some of the locations where fencing would be constructed have been previously surveyed for cultural resources; only one archaeological site is located within the proposed fencing area. The site (CA-SBR-12950), a Saratoga Springs Period complex occupation site, was considered eligible for listing in the NRHP under Criterion D (Luzier 2016). The Marine Corps determined that the fencing would “not adversely affect (alter, directly or indirectly) any characteristics of a historic property that qualify it for inclusion in the NRHP or in a manner that would diminish the property’s integrity” given the incorporation of certain conditions. These conditions included the following:

- CA-SBR-12950 would be flagged and it would be monitored by a NREA-approved archaeologist to ensure that it was not inadvertently disturbed or affected;
- Archaeological monitors would be present during all sign and post emplacements and the trenching to ensure that no cultural resources were disturbed;
- Any new archaeological sites would be recorded and entered into both the NREA’s and the State’s databases; and
- Construction material laydown areas (located on the new maintenance road) would be restricted to the defined APE and placement would be monitored by archaeological monitors to ensure that no cultural resources were disturbed.

The California SHPO concurred with the determination of “no adverse effect” to historic properties (Polanco 2016). These conditions have been incorporated into Section 2.6, *Special Conservation Measures*. With the implementation of these SCMs, there would be no direct or indirect impacts from Alternative 1 to prehistoric or historic sites due to fencing.

In addition to the installation of fencing, a permanent maintenance road would be located along the fenceline within the Combat Center lands. As discussed above, an archaeological monitor would be present for maintenance road construction. The monitor would ensure that roads would be placed in a manner that would avoid any archaeological site or features.

Helicopter landings would also be conducted as part of Alternative 1 within recipient sites located both on BLM and Combat Center lands. The helicopters would land within MSRs or other existing/routes,

preferably within intersections of roads. These landings would occur over a 10- to 12-day period within the release areas to translocate the desert tortoise. A total of 40 to 50 helicopter trips are anticipated with 4 occurring per day. As per the BLM Stipulations discussed in Section 2.6, *Special Conservation Measures*, the Marine Corps would survey any proposed helicopter landing sites located on BLM lands for cultural resources before use. All landing sites would be placed at least 100 ft (30 m) from any historic property.

With the implementation of these SCMs, there would be no direct or indirect impacts to NRHP-eligible historic properties within the helicopter landing areas. The helicopters would land on areas already within MSRs or within existing roads/routes and would not disturb archaeological sites or features. The Combat Center would re-initiate Section 106 consultation with the California SHPO regarding the helicopter landing areas. This consultation would be completed before the ROD for this SEIS is signed.

4.4.3.2 Cultural and Spiritual Landscape for the Colorado River Indian Tribes

The cultural landscape for the Colorado River Indian Tribes covers all of the lands within the Combat Center and the APE for the proposed action. Under Alternative 1, relocation of desert tortoise would occur within this landscape, as the desire is to relocate tortoises to habitats comparable to their current locations in terms of vegetation, topography, climate, etc. All of the proposed recipient sites have previously hosted higher densities of desert tortoise than are present currently; movement of additional tortoise to these locations is thus consistent with historic levels of tortoise in these locations. Given the tortoises must be relocated from the medium- and high-intensity impact areas to avoid harm, the translocation effort benefits the long-term health of the tortoise population on the landscape compared to leaving the tortoise in place. In addition, the ongoing monitoring of tortoises throughout the Combat Center, and the research efforts to increase the health of the tortoise population, all serve to benefit the tortoise population overall. Taken together, the actions outlined in the March 2016 Translocation Plan (Alternative 1) would have less than significant impacts on the desert tortoise as part of the cultural and spiritual landscape for the Colorado River Indian Tribes. The Combat Center will address the concerns of the Colorado River Indian Tribes as part of government-to-government consultation, as outlined in Department of Defense Instruction 4710.02.

4.4.3.3 Potential Mitigation Measures

No significant impacts to cultural resources have been identified under the Alternative 1. Therefore, except for the SCMs discussed in Section 2.6, no additional mitigation measures are identified for Alternative 1.

4.4.4 Alternative 2 (Preferred Alternative) Impacts

4.4.4.1 Historic Properties

Impacts to historic properties under Alternative 2 are similar to those under Alternative 1. There would be no direct or indirect impacts from fencing, maintenance road construction, or helicopter landings under Alternative 2 to NRHP-eligible historic properties with the implementation of SCMs identified in Section 2.6.

4.4.4.2 Cultural and Spiritual Landscape for the Colorado River Indian Tribes

The cultural landscape for the Colorado River Indian Tribes covers all of the lands within the Combat Center and the APE for the proposed action. Under Alternative 2, relocation of desert tortoise would occur within this landscape, as the desire is to relocate tortoises to habitats comparable to their current locations in terms of vegetation, topography, climate, etc. All of the proposed recipient sites have

previously hosted higher densities of desert tortoise than are present currently; movement of additional tortoise to these locations is thus consistent with historic levels of tortoise in these locations. Given the tortoises must be relocated from the medium- and high-intensity impact areas to avoid harm, the translocation effort benefits the long-term health of the tortoise population on the landscape compared to leaving the tortoise in place. In addition, the ongoing monitoring of tortoises throughout the Combat Center, and the research efforts to increase the health of the tortoise population, all serve to benefit the tortoise population overall. Taken together, the actions outlined in the June 2016 Translocation Plan (Alternative 2) would have less than significant impacts on the desert tortoise as part of the cultural and spiritual landscape for the Colorado River Indian Tribes. The Combat Center will address the concerns of the Colorado River Indian Tribes as part of government-to-government consultation, as outlined in Department of Defense Instruction 4710.02.

4.4.4.3 Potential Mitigation Measures

No significant impacts to cultural resources have been identified under the Alternative 2. Therefore, except for the SCMs discussed in Section 2.6, no additional mitigation measures are identified for Alternative 2.

4.4.5 Summary of Impacts – Cultural Resources

Because specific avoidance measures and SCMs (as described in Section 2.6) would be followed during ground disturbing activities (e.g., fence installation, maintenance road construction, and helicopter landings), direct or indirect impacts to prehistoric and historic sites would be less than significant (Table 4.4-1).

Table 4.4-1. Summary of Impacts for Cultural Resources

Alternative	Impacts
No-Action Alternative	<p>LSI <u>Cultural and Spiritual Landscape</u></p> <ul style="list-style-type: none"> Less than significant impacts to the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes. Consultation with the Tribes on this issue is ongoing. <p>NI <u>Historic Properties</u></p> <ul style="list-style-type: none"> No impacts to historic properties (prehistoric or historic sites, traditional cultural properties) due to the implementation of the SCMs.
Alternative 1	<p>LSI <u>Cultural and Spiritual Landscape</u></p> <ul style="list-style-type: none"> Less than significant impacts to the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes. Consultation with the Tribes on this issue is ongoing. <p>NI <u>Historic Properties</u></p> <ul style="list-style-type: none"> Impacts to historic properties would be the same as the No-Action Alternative, with the addition of the use of helicopter landing areas occurring on MSRs or within existing roads/routes. With the implementation of the SCMs, no impacts to historic properties are anticipated due to helicopter landings.
Alternative 2	<ul style="list-style-type: none"> Impacts would be the same as Alternative 1.

Legend: LSI = Less than significant impacts. NI = No impact.

CHAPTER 5

CUMULATIVE IMPACTS

5.1 OVERVIEW OF CUMULATIVE EFFECTS ANALYSIS

The CEQ regulations implementing the procedural provisions of NEPA define cumulative effects as:

“The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.” (40 CFR § 1508.7).

The CEQ also provides guidance on cumulative impacts analysis in *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997), and the *Memorandum Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ 2005). Noting that environmental impacts result from a diversity of sources and processes, CEQ guidance observes that “no universally accepted framework for cumulative effects analysis exists,” while noting that certain general principles have gained acceptance. One such principle provides that, “cumulative effects analysis should be conducted within the context of resource, ecosystem, and community thresholds—levels of stress beyond which the desired condition degrades.” Thus, “each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects, based on its own time and space parameters.”

5.2 GEOGRAPHIC AND TEMPORAL BOUNDARIES FOR CUMULATIVE IMPACTS ANALYSIS

Cumulative effects analysis normally encompasses geographic boundaries beyond the immediate area of the proposed action, and a timeframe including past actions and reasonably foreseeable future actions, to capture these additional effects. The geographic scope of the cumulative effects analysis varies by resource area. For example, the geographic scope of cumulative impacts on resources such as soils and vegetation is localized, whereas the geographic scope of air quality is the region. For the purposes of this analysis, the Marine Corps identified proposed projects approximately 30 miles (38 km) from the boundary of the Combat Center and proposed recipient and control areas and sites for cumulative effects analysis in the SEIS.

5.3 OTHER PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Identifiable effects of other past, present, and reasonably foreseeable actions are analyzed and evaluated to the extent they may be additive to impacts of the proposed action. In general, the Marine Corps need not list or analyze the effects of individual past actions; cumulative impacts analysis appropriately focuses on aggregate effects of past actions. Reasonably foreseeable future actions that may have impacts additive to the effects of the proposed action are also analyzed. As part of the evaluation of cumulative impacts, a review of other projects in the vicinity of the proposed action was conducted. Other past, present, and reasonably foreseeable actions that could interact directly or indirectly with the proposed action are discussed below. Other projects at the Combat Center that do not have the potential to interact cumulatively with the proposed action are not addressed in this SEIS.

5.3.1 Projects Associated With the Combat Center

5.3.1.1 Desert Tortoise Captive Rearing Facility (“Head Start”) at the Combat Center

An Environmental Assessment (EA) was prepared in September 2005 to evaluate the environmental impacts associated with the construction and operation of a desert tortoise captive rearing (“head start”) facility at the MCAGCC. The facility would aid in the recovery and eventual delisting of the Desert Tortoise (*Gopherus agassizii*). The proposed action would allow the protection of hatchling and juvenile desert tortoises from predation, and allow for their release and natural reproduction in the wild. Resources that were analyzed for impact included biological resources, air quality, water resources, cultural resources and public health and safety. Based on the results of the analysis, it was determined that there would be no significant environmental impacts with implementation of the action. A Finding of No Significant Impact (FONSI) was signed on October 12, 2005.

5.3.1.2 Combined Arms Military Operations in Urban Terrain at the Combat Center

A Combined Arms Military Operations in Urban Terrain training facility was constructed at the Combat Center in 2007. The facility resembles a 900-acre (364-ha) generic “developing nation” community consisting of more than 1,500 buildings, various roadways (from alleyways to boulevards), a stadium, rubble piles, plazas, squares, and a dry river. The Combined Arms Military Operations in Urban Terrain facility will eventually consist of several areas. The project resulted in 19 tortoises being translocated from the project area to the Sand Hill Training Area on the Combat Center. Off-road mechanized training is prohibited in the Category 1 (restricted) Special Use Area in the Sand Hill Training Area where the desert tortoises were relocated.

5.3.1.3 Proposed Increase in End Strength and Temporary Facility Bed-down

An EA was prepared in October 2007 to evaluate the environmental impacts associated with the Marine Corps’ Grow the Force Initiative; a proposed increase in end strength of 2,125 personnel and associated dependents at the Combat Center, phased over a 4 year time period. Total personnel increase is anticipated to be completed by 2011. The proposed action included the construction of temporary supporting facilities in the Mainside area to support the increase in personnel, and the subsequent removal of these facilities once permanent facilities had been constructed. Resources that were evaluated for impact included biological resources, cultural resources, air quality, socioeconomics, transportation and circulation, utilities, and public health and safety. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the action. A FONSI was signed on December 13, 2007. The construction of temporary facilities, and subsequent removal, would not have any temporal overlap with the activities under the proposed action. The additional personnel would still be present at the Combat Center during and after implementation of the proposed land acquisition.

5.3.1.4 Permanent Facilities Bed-Down of Increased End-Strength

An EA was prepared in September 2009 to evaluate the environmental impacts associated with construction of permanent facilities and infrastructure and the addition of 300 Marines at the Combat Center to support the Marine Corps’ Grow the Force Initiative. All construction is expected to be completed by 2016. Resources that were evaluated for impact included geological resources, biological resources, cultural resources, air quality, socioeconomics, utilities and community services, transportation and circulation, and public health and safety. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the action. A FONSI was signed on September 29, 2009.

5.3.1.5 West Coast Basing of the F-35B

An EIS was prepared to analyze potential impacts from the proposed west coast basing of 184 F-35B aircraft. The F-35B aircraft would replace 126 legacy F/A-18A/B/C/D Hornet and 56 AV-8B Harrier aircraft in the Third Marine Air Wing and Fourth Marine Air Wing. The proposed action would include:

- Basing of 11 operational F-35B Joint Strike Fighter squadrons (176 aircraft), and one F-35B Operational Test and Evaluation squadron (8 aircraft) on the West Coast of the U.S.;
- Construction and/or renovation of airfield facilities and infrastructure necessary to accommodate and maintain the F-35B squadrons;
- Changes to personnel to accommodate squadron staffing; and
- Conducting F-35B readiness and training operations to attain and maintain proficiency in the operational employment of the F-35B and special exercise operations.

The EIS addressed five action alternatives for basing, and the No-Action Alternative, none of which are at the Combat Center. However, the action includes occasional use of airspace overlaying the Combat Center: Restricted Area R-2501 North, South, East, and West; Bristol Air Traffic Control Assigned Airspace and Military Operations Area; and Sundance Military Operations Area. The frequency of airspace use would be equivalent to or less than current use by the aircraft that would be replaced by the F-35B. The NOI was published in the Federal Register on January 15, 2009, and the public comment period on the Draft EIS occurred May 21 to July 6, 2010. The Notice of Availability for the Final EIS was published in the Federal Register on October 22, 2010.

5.3.1.6 West Coast Basing of the MV-22

West Coast Basing of the MV-22 Osprey tilt-rotor (MV-22) aircraft would require construction of expanded apron space and hangar upgrades at Marine Corps Air Station Miramar and Marine Corps Air Station Pendleton. The Marine Corps estimates these MV-22s would fly about 3,900 operations annually at the Twentynine Palms Expeditionary Airfield and in the associated airspaces, replacing transient helicopter traffic. Transition from the helicopters to the MV-22 is scheduled to occur between 2010 and 2020. A Final EIS was prepared for this action with a ROD signed on November 19, 2009.

5.3.1.7 Aerial Maneuver Zones for MV-22 and Rotary-Wing Training

An EA has been completed to analyze the impacts associated with the use of aerial maneuver zones by MV-22 aircraft and rotary-wing aircraft at the Combat Center. Under the proposed action, up to eight MV-22 aircraft squadrons (12 aircraft per squadron) would be integrated into the existing/on-going tactical and ground training activities. Established Special Use Airspace would not be expanded or modified with implementation of the proposed action. The EA addressed two action alternatives and the No-Action Alternative. Resources evaluated for impact include biological resources, cultural resources, air quality, and noise. The FONSI for this project was signed in May 2010.

5.3.1.8 Electrical System Upgrade at the Combat Center

An EA was prepared to evaluate the potential environmental impacts associated with P-128, Electrical Infrastructure Upgrades, which would construct and extend utilities to the new substation constructed by P-127 in support of planned facilities in the North Mainside build-out area. The project would construct the Leatherneck substation and upgrades to the Hi-Desert and Carodean substations off installation. The new transmission substation would be constructed with three regulated transmission substation transformers (115-kilovolt & 34.5-kilovolt). Also, 115-kilovolt and 38-kilovolt switching and protective

devices would be constructed at Building 3083J in the vicinity of the existing Ocotillo switching station. Existing substation upgrades include upgrading the existing Southern California Edison dedicated 34.5-kilovolt medium voltage distribution system to a 115-kilovolt high voltage transmission system and adding a new 115-kilovolt high voltage transmission loop. In addition, a new 3-phase, 3-wire, 34.5-kilovolt medium voltage distribution line on 60 ft (18 m) class I poles would be extended. Supporting facilities include utility easements for the new utility corridor off-installation. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI for the P-128 Electrical Infrastructure Upgrades was signed on March 24, 2011.

5.3.1.9 Ocotillo Marine Mart

An EA was prepared in 2012 to evaluate the potential environmental impacts associated with construction of a new exchange, gas station, and ancillary improvements. The development footprint for this project is located within the Ocotillo Heights area of Mainside. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI for the EA was signed on March 19, 2012 (DON and Marine Corps 2012).

5.3.1.10 Adult Medical Care Clinic Replacement

An EA was prepared to evaluate the potential environmental impacts associated with the proposed construction and operation of a replacement Adult Medical Care Clinic at the Combat Center. The proposed action involved the construction and operation of a replacement Adult Medical Care Clinic after the demolition of the existing Adult Medical Care Clinic buildings as well as the relocation of all personnel associated with the Adult Medical Care Clinic. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI was signed for the EA on February 22, 2013 (DON 2013b).

5.3.1.11 Land Acquisition/Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training

An EIS was prepared to evaluate the impacts from the proposed extension of existing installation operating areas through acquisition of additional training lands, modification and establishment of military special use airspace, and implementation of MEB-level sustained, combined-arms, live-fire, and maneuver training exercises within current and proposed operating areas at the Combat Center. Proposed training activities would occur within existing training areas and within proposed land acquisition areas located along the border of the Combat Center. The expansion areas are located to the west, south, and east of the Combat Center. Major resource areas of concern included biological resources, cultural resources, air quality, socioeconomics, recreation, land use, health and safety, and airspace management. A Final EIS was published in July 2012 (DON 2012). The ROD concluded that there would be a significant impact to the desert tortoise; however, it would not result in jeopardy of the species (DON 2013). Upon conclusion of ESA section 7 consultations, the USFWS concluded in the Land Acquisition BO that take would occur due to military operations and concentrated OHV usage in the Johnson Valley area (USFWS 2012).

5.3.1.12 241-acre Solar Photovoltaic System

An EA was prepared in 2015 to evaluate the potential environmental impacts associated with the construction, operation, maintenance, and eventual decommissioning of a 241 acre (98 ha) solar photovoltaic system at Mainside, west of Adobe Road and a transmission line to transmit the energy to the civilian grid (MCAGCC 2015f). The photovoltaic site consists of disturbed vacant land that was

previously used as an airfield. Depending on the type of photovoltaic panel selected by the operator/lessee, the proposed project could produce 25-57 megawatts of power. Based on the results of the analysis, it was determined that there would be no significant impacts to the environment with implementation of the proposed action. A FONSI was signed for the EA on November 16, 2015.

5.3.1.13 Ongoing Training

An EA is being prepared to evaluate the potential environmental impacts associated with the proposed updates to ongoing training activities. At present, training at the Combat Center is covered by the 2003 Ongoing and Proposed Training Activities Programmatic EA (Marine Corps 2003). This EA is near the end of its life cycle and is restrictive in the types of training allowed. The new Ongoing Training EA is needed to enable operators to quickly determine the type of training that can be performed as well as where (i.e., in which zones/areas) the training can be performed within the installation. The new Ongoing Training EA will also analyze impacts associated with the use of current and future technologies, tactics, and equipment.

5.3.1.14 Water Treatment Plant at the Combat Center

An EA will be prepared to evaluate the potential environmental impacts associated with a proposed drinking water treatment plant and installation of three groundwater wells at the Combat Center. The proposed action would: (1) provide drinking water to MCAGCC personnel that meet the federal and State of California standards for drinking water; and (2) allow for the longevity of a quality drinking water from drinking water sources within MCAGCC boundary. The No-Action Alternative assumes that MCAGCC minimize the existing groundwater source that did not meet federal or state drinking water quality standards. The EA addresses five action alternatives and the No-Action Alternative. The proposed action would provide a long-term supply of drinking water to MCAGCC personnel that meets federal and state mandated water quality standards. On July 1, 2014, the State of California adopted regulations that reduced the maximum contaminate level of natural occurring hexavalent chromium or Chromium-6 to 0.010 milligram per liter (equivalent to 10 micrograms per liter) from 50 micrograms per liter. MCAGCC has two of 11 wells that currently do not meet this new standard and it is projected that the remaining groundwater wells will eventually not meet the new drinking water standard. MCAGCC evaluated five State of California approved treatment alternatives to meet the requirements of the State as well as provide the greatest long-term solution for treatment if additional constituents maximum contaminant levels were lowered and allow the use of additional sources of groundwater for drinking purposes. Potential impacts were analyzed for geological resources, biological resources, water resources, cultural resources, aesthetics, air quality, electrical utilities, socioeconomics, and public health and safety. No significant environmental impacts are expected to result from any of the action alternatives, which differ in treatment methods. A FONSI is expected in 2017, and it is expected that the water plant will be constructed in approximately 1 year.

5.3.1.15 General Military Construction Projects

The remaining projects listed in Table 5.3-1 are construction projects that would occur in the Mainside area of the Combat Center between the 2012 and 2019 timeframe. These projects are not well-defined at this time, and very little information is available to characterize the potential effects of each project.

Table 5.3-1. Construction Projects at the Combat Center

Project Number	Project Title	Date (FY)
P177	MULTI-USE OPERATIONAL FITNESS AREA	2012
P105	TRACKED VEHICLE MAINTENANCE COVER	2012
P184	ADULT MEDICAL CARE CLINIC	2013
P159	CAMP WILSON INFRASTRUCTURE UPGRADE	2014
P1232	MICROGRID EXPANSION	2016
P192	POTABLE WATER TREATMENT / BLENDING FACILITY	2018
P1231	WASTEWATER TREATMENT PLANT	2018
P221	MCTOG/MCLOG/INTEL COMPLEX	2018
P1233	CENTER MAGAZINE AREA SAFETY UPGRADES	2018
P924	BATTLE SIMULATION TRAINING CENTER	2018
P988	MCAGCC GATE RECONFIGURATION	2018
P680	WEST GYM ADDITION	2019
P558	SUBSISTENCE STORAGE FACILITY	2019
P900	MCCES CLASSROOM	2019
P182	BATTALION OPERATIONS CENTER	2019
P990	RANGE CONTROL FACILITY	2019
P926B	LIBRARY / LIFELONG LEARNING CENTER, PHASE II	2019
P216	CAMP WILSON TRAINING OPS FUELING FACILITY	2019
P930	CONSTRUCT PWD AND ROICC FACILITY	2020
P504	CONSOLIDATED COMMUNITY SUPP.	2020
P160	EXPEDITIONARY TRAINING SUPPORT	2020
P581	MCAGCC HQ BUILDING	2020
P989	AT/FP PERIMETER FENCE	2020
P954	MAGTFTC OPERATIONS CENTER	2021
P194	CONVERT BUILDING 2025 TO WHEELED VEHICLE MAINTENANCE FACILITY	2021
P193	MTU/RTAMS MULTI-PURPOSE CLASSROOM	2021
P617	WASTE HANDLING AND RECOV FACILITY	2021
P226	MCAGCC LEAR ROAD GATE	2021
P618	MULTI-PURPOSE ADMINISTRATION BUILDING	2021
P109	GROW THE FORCE - TACTICAL VEHICLE WASH RACK	2022
P191	ADDITION TO CAMP WILSON GYM	2022
P602	TRAINING INTEGRATION CENTER	2022
P927	MCCES CLASSROOM	2022
P902	MCCES VEHICLE MAINTENANCE & SUPPLY FACILITY	2022
P928	MCCES CLASSROOM	2022
P603	MCCES EQUIPMENT FACILITY	2022
P929	MCCES CLASSROOM	_*
P903	MCCES CONSOLIDATED RADAR CLASSROOM	_*
P911	MCCES CLASSROOM	_*

Legend: AT/FP = Anti-Terrorism/Force Protection; FY = Fiscal Year; HQ = headquarters; MCAGCC = Marine Corps Air Ground Combat Center; MCCES = Marine Corps Communication and Electronic School; MCLOG = Marine Corps Logistics Operations Group; MTU = Marksmanship Training Unit; PWD = Public Works Division; ROICC = Resident Office in Charge of Construction; RTAMS = Range Training Area Maintenance Section.

Note: *Date to be determined, but expected to be 2022 or later.

Source: MCAGCC 2016d.

5.3.2 Projects in the Surrounding Area

General community development and growth is expected to occur in all local and regional areas. Therefore, projects such as redevelopment of existing commercial areas, commercial and residential growth, and road maintenance projects are expected to occur in all areas surrounding the installation and in proximity to the proposed acquisition study areas. Figure 5.3-1 identifies the approximate project locations for the past, present, and reasonably foreseeable actions occurring in the surrounding area (if project location information was available).

5.3.2.1 Increased Use of Twentynine Palms Valley Groundwater Basin

The Twentynine Palms Water District (TPWD) initiated a groundwater study of the Twentynine Palms Valley Basin (described by the USGS as the Mesquite subbasin) to determine the effects of increased pumping on the basin. The Twentynine Palms Valley Basin had not been previously tapped for water supply by TPWD because of water quality concerns (particularly fluoride, which prevented the water from being used without treatment). The TPWD explored the possibility of shifting additional water production from the Joshua Tree Basin to the Twentynine Palms Valley Basin to stabilize water levels within the Joshua Tree Basin. The results of this study were used to determine whether or not the District could manage its groundwater basins by shifting supply from the heavily-used Joshua Basin to the less-utilized Twentynine Palms Valley Basin (TPWD 2008). The TPWD has since expanded groundwater production to the Twentynine Palms Valley Basin. This groundwater requires water treatment for fluoride and is treated at the Fluoride Removal Water Treatment Plant. The plant operates at 40% capacity, but the TPWD plans to increase this capacity as well as install additional production wells (TPWD 2014).

5.3.2.2 Cadiz Valley Water Conservation, Recovery, and Storage Project

The Cadiz Valley Water Conservation, Recovery, and Storage Project is designed to capture and conserve thousands of acre-feet of native groundwater currently being evaporated from Cadiz and Bristol Dry Lakes. In Phase 1 of the project, a wellfield would be constructed to create a sustainable annual water supply through the capture of the average annual natural recharge in the aquifer system plus an amount needed to maintain hydrologic control in the vicinity of the wellfield. An estimated 50,000 acre-feet per year would be recovered by wells and conveyed to the Colorado River Aqueduct via a 42-mile (68-km) conveyance pipeline constructed within the Arizona and California Railroad right-of-way. The water would be delivered to participating water agencies throughout southern California. In Phase 2, recharge basins would be used to recharge surplus water available during ‘wet’ years on the Colorado River or by way of exchanges from other imported water sources. Total imported water storage capacity is estimated at approximately 1,000,000 acre-feet. Project facilities for Phase 1 and Phase 2 would be built on the property of Cadiz Inc. and other privately-owned land east of the Combat Center (Cadiz Inc. 2011).

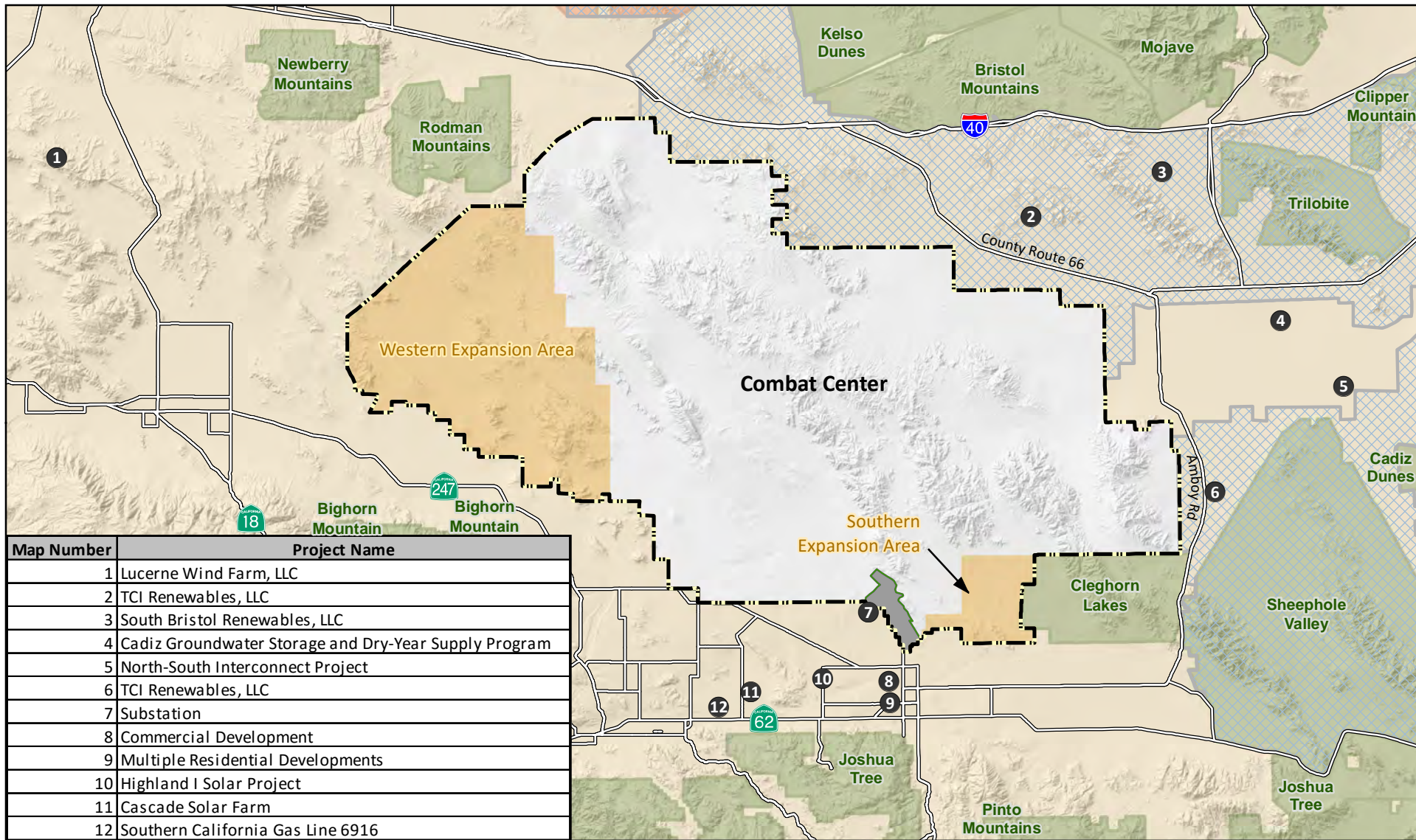


Figure 5.3-1. Past, Present, and Reasonably Foreseeable Actions



Cadiz Inc. has entered into agreements to participate in the development of the project with the following five southern California water agencies: Santa Margarita Water District, Three Valleys Municipal Water District, Golden State Water Company, Suburban Water Systems and Jurupa Community Services District. As part of the agreements, Santa Margarita Water District is the lead agency for the California Environmental Quality Act (CEQA) process. In July 2012, the Final EIS was released and the project was approved under CEQA. The company has won all legal challenges against the project, but continues to contest a BLM decision that the project cannot use an existing Arizona/California Railroad right-of-way to create a pipeline to the Colorado River Aqueduct (Marstel-Day, LLC 2016). Therefore, as of September 2016, the project has not been constructed. According to an economic impact report (Husing 2011). Construction of the Cadiz Inc. project would take place in four phases over 4 years; the exact timing of the project is unknown.

5.3.2.3 Expansion of Granite Construction

According to Twentynine Palms Planning File PC 06-51, Granite Construction is proposing to expand an existing mine to include an additional 356 acres (144 ha) of land for a total of 469.5 acres (190 ha), of which 178 acres (72 ha) would be preserved as open space. The proposed expansion seeks to increase the annual aggregate production from 330,000 tons to 450,000 tons and extend the mine's closure date from 2008 to 2092. The plan proposes reclamation activities to be concurrent with the project. The mine site would be restored to un-irrigated open space, a retention basin for flood control, and wildlife habitat at closure of the mine. In July 2010, the Twentynine Palms Planning Commission voted in favor of a zone change and approved a Final Environmental Impact Report and Mitigation Monitoring Program that would allow the expansion to take place (Vaughn 2010). The mine expansion has not been considered by the City of Twentynine Palms and a decision date has not been identified.

5.3.2.4 Cascade Solar Farm

The Cascade Solar Farm was developed and held by Cascade Solar, LLC a subsidiary of Axio Power Holdings, LLC. The project application was submitted mid-2011 and began construction early 2013. The 19 megawatt project was built on approximately 150 acres (60 ha) using photovoltaic technology and is located in the unincorporated community of Joshua Tree approximately 11.5 miles (18.5 km) southwest of Mainside. In addition, the project is located on Cascade Road north of Highway 62, less than 1 mile east of the proposed Joshua Tree Solar Farm. The project was completed and placed into operation in April 2014.

5.3.2.5 Highland Solar I Project (SEPV8)

Solar Electric Solutions submitted an application early 2011 to develop a 12 megawatt, 100 acre (40 ha) project originally named "SEPV8." The project is located approximately 6.5 miles (10.5 km) from Mainside on Lear Avenue, north of Highway 62. Solar Electric Solutions started construction in mid-2011 and later sold the project to SolarWorld in May 2012. The project was completed and placed into operation in December 2012. In early 2013, the project was sold to Duke Energy and renamed to Highland Solar I. The project currently consists of 100,188 solar photovoltaic modules and has a twin project named Highland Solar 2. The two projects run as a single operation.

5.3.2.6 Senate Bill 414: California Desert Conservation and Recreation Act of 2015

Introduced into Congress on February 9, 2015, the California Desert Conservation and Recreation Act (CDCRA) of 2015 Senate Bill (S.414) would build upon the legacy of the 1994 California Desert Conservation Act, which protected more than 7 million acres of pristine desert in southern California, and established Death Valley National Park, Joshua Tree National Park, and the Mojave National Preserve.

This first title of the bill deals primarily with conservation and recreation purposes. The bill would designate the following:

- Two new national monuments in the Mojave Desert (the 965,000-acre [390,523 ha] Mojave Trails National Monument and the 135,000-acre [54,633 ha] Sand to Snow National Monument);
- Six new BLM wilderness areas covering 250,000 acres (101,172 ha);
- 18,610 acres (7,532 ha) of BLM land in Inyo County as the Alabama Hills National Scenic Area, preserving it for continued recreational use;
- 77 miles (124 km) of waterways as Wild and Scenic Rivers;
- Add acreage to Death Valley National Park (39,000 acres [15,783 ha]), Joshua Tree National Park (4,500 acres [1,821 ha]), and the Mojave National Preserve (22,000 acres [8,903 ha]); and
- Five existing BLM OHV areas (covering approximately 142,000 acres [57,466 ha] of California desert) as permanent OHV recreation areas, providing off-highway enthusiasts certainty that these uses of the desert will be protected in a manner similar to conservation areas.

The Bill would provide a balanced approach to renewable energy development through several provisions. For example, the bill:

- Encourages the development of new renewable energy in solar zones established by the federal government, avoiding conflicts over lands long intended for conservation;
- Requires the exchange of hundreds of thousands of acres of isolated state parcels currently surrounded by national parks and wilderness, providing the state with lands that could be used for renewable energy, recreation, or conservation; and
- Allows for upgrades to transmission lines necessary to bring clean energy from new desert solar and wind farms to urban areas, while still protecting pristine landscapes.

The CDCRA was considered during hearings of the Energy and Natural Resources Subcommittee on Public Lands, Forests, and Mining on October 8, 2015. The CDCRA has a related House of Representatives Bill 3668, California Minerals, Off-Road Recreation, and Conservation Act (CMORCA) as described in Section 5.3.2.13. Presidential Proclamation designated the Mojave Trails National Monument in February 2016, as described in Section 5.3.2.14.

5.3.2.7 House of Representatives Bill 3668: The California Minerals, Off-Road Recreation, and Conservation Act

Introduced to the House of Representatives on 1 October 2015, House of Representatives Bill 3668, the CMORCA presents a balanced approach to protecting, managing, and using desert and forest areas in San Bernardino and Inyo Counties. This bill deals with managing existing federal land and does not increase federal land ownership.

The bill would designate the following:

- A total of six existing administrative OHV areas as “National Off-Highway Vehicle Recreation Areas.” These are Johnson Valley, Spangler Hills, El Mirage, Rasor, Dumont Dunes, and Stoddard Valley. This would give additional protection to OHV users by ensuring that the areas couldn’t be closed administratively and would set up the first system of National OHV Recreation

Areas in the nation. The Johnson Valley OHV Recreation Area would be expanded to connect the two separate areas that make up the Johnson Valley OHV Recreation Area.

- Approximately 342,000 acres (138,403 ha) of wilderness study areas in the California Desert would be designated as permanent wilderness areas.
- Add approximately 68,000 acres (27,519 ha) of land to the National Park System.
- Designate 77 miles (124 km) of wild, scenic, and recreational rivers.
- Designate approximately 6,500 acres (2,630 ha) of BLM land north of Yucca Valley and west of Flamingo Heights as an ACEC.
- Designate a “special management area” covering approximately 965,000 acres (390,523 ha) in the Mojave Desert northeast of the Marine Corps Air Ground Combat Center (i.e., the Mojave Trails National Monument).
- Establish a national monument covering approximately 140,000 acres (56,656 ha) of federal land between Joshua Tree National Park and the San Bernardino National Forest in San Bernardino and Riverside Counties.
- Provide for several land exchanges to consolidate private holdings within Sand to Snow National Monument and conveys approximately 4,710 acres (1,906 ha) of land to the Town of Apple Valley and the City of Twentynine Palms. Specifically, it transfers 80 acres (32 ha) to Twentynine Palms to add to a park and recreation area.

The CDCRA was considered during hearings of the House Natural Resources Subcommittee on Federal Lands on 9 December October 2015. The CMORCA has a related Senate Bill 414 CDCRA, as described in Section 5.3.2.12. Presidential Proclamation designated the Mojave Trails National Monument in February 2016, as described in Section 5.3.2.14.

5.3.2.8 Mojave Trails National Monument

The Mojave Trails National Monument was designated by Presidential Proclamation in February 2016 and encompasses approximately 1.6 million acres (647,500 ha) of federal lands currently managed by the BLM between Barstow and Needles, California. The Mojave Trails National Monument is located north and east of the Combat Center and contains approximately 358,000 acres (145,000 ha) of established wilderness areas and 84,400 acres (34,200 ha) currently managed by the BLM as the Cady Mountains Wilderness Study Area. The monument also protects irreplaceable historic resources including ancient Native American trading routes, World War II-era training camps, and the longest remaining undeveloped stretch of Route 66. The designation preserves and enhances public access, such as for hunting and fishing, which continue to be managed by the State of California. Motorized vehicle use is limited to roads existing as of the date of this proclamation. The BLM is currently developing a Mojave Trails National Monument Management Plan.

5.3.2.9 Desert Renewable Energy Conservation Plan

The DRECP is a landscape-scale planning effort designed to provide for additional protection and conservation of desert ecosystems in conjunction with development of solar, wind, and geothermal energy projects. The DRECP covers 22.5 million acres (9.1 million ha) in seven California counties (Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego) (BLM 2015c). The plan is being prepared in two phases by the Renewable Energy Action Team, composed of the BLM, USFWS, California Energy Commission, and the CDFW:

- Phase I of the DRECP addressed the BLM component of the Plan that designated development focus areas, conservation areas, and recreation areas on public lands. Phase I placed particular emphasis on designating areas for renewable energy development and completed a BLM Land Use Plan Amendment for the DRECP area. The Land Use Plan Amendment also eliminated the Multiple Use Classes in the CDCA Plan and replaced them with specific land designations (BLM 2016b). The BLM released the Final EIS for the Land Use Plan Amendment in November of 2015 (BLM 2015c) and the public comment period ended on May 9, 2016; the related ROD was signed September 14, 2016 (BLM 2016b).
- Phase II of the DRECP is pending, will address issues and concerns related to non-BLM components of the DRECP, and will focus on aligning local, state, and federal renewable energy development and conservation plans, policies and goals.

5.3.2.10 West Mojave Plan

In February 2015, the BLM published the Draft Supplemental EIS for the WMRNP and Plan Amendment (BLM 2015b). The WMRNP is a travel management planning effort covering 9.24 million acres (3.74 million ha) in the West Mojave area of the California desert that supplements the 2006 West Mojave Plan (BLM 2006). The supplemental plan has two general sets of goals that include (1) Access Management (i.e., identification of an overall travel and transportation management strategy, implementation framework, and access network for public land users in the West Mojave); and (2) Livestock Grazing (i.e., additional livestock grazing alternatives that may enhance long-term conservation goals identified in the 2006 West Mojave Plan). The public comment period for the Draft EIS closed in January of 2016 (BLM 2016a); the Final EIS and ROD are pending.

5.3.2.11 Development within the City of Twentynine Palms

A majority of the future planned or proposed projects for the City of Twentynine Palms are located along Adobe Road. These projects consist primarily of standard commercial development. In addition, there are a number of residential housing projects proposed for development east and southeast of Twentynine Palms. All projects are proposed to occur within the next 5 to 10 years as part of standard planning and community growth. The City of Twentynine Palms is required to implement CEQA for any projects that are determined not to be exempt from CEQA. Therefore, any project that is determined to have significant environmental effects would be required to mitigate these impacts to a level of insignificance (City of Twentynine Palms 2010). The following commercial and residential projects located in the vicinity of the proposed action and have been approved or are pending:

- **80-acre Commercial Development Project** – Project to develop 80 acres (32 ha) for retail businesses, multi-family housing, and restaurants. Located on the northeast corner of Adobe Road and Valle Vista, just outside of the main gate of the Combat Center. The project was approved by the City of Twentynine Palms, but no construction was initiated and the application expired.
- **35-acre Residential Development Project** – Proposed development of 35 acres (14 ha) for 135 lots. Located on Amboy Road west of Adobe Road and south of the south study area. The tentative tract map was approved October 4, 2005, but the project is currently on hold.
- **10-acre Residential Development Project** – Pulliam Construction proposal to develop 10 acres (4 ha) for four lots. Located on the northwest corner of Utah Trail and Indian Trail, southwest of

the south study area. The tentative tract map was approved May 15, 2005; project currently on hold.

- **5-acre Residential Development Project** - Sunwest Development proposal to develop 5 acres (2 ha) for 17 lots. Located on Amboy Road west of Adobe Road, and south of the south study area. Project pending.

5.4 POTENTIAL CUMULATIVE IMPACTS BY ENVIRONMENTAL RESOURCE

5.4.1 Biological Resources

5.4.1.1 No-Action Alternative

Vegetation

Under the No-Action Alternative, a relatively limited acreage of vegetation (less than half of 1% of the project area) would be affected by ground-disturbing activities (e.g., fence installation and road construction; see Section 4.1.2.1) that, with the implementation of proposed SCMs (Section 2.6), would result in a less than significant impact to vegetation on a project-level basis. However, the past, present, and reasonably foreseeable future actions (particularly renewable energy development projects) described in Section 5.3 would result in significant cumulative impacts to vegetation.

Desert Tortoise

As described in Section 4.1, impacts to biological resources would be less than significant on a project-level basis with implementation of the No-Action Alternative. However, the past, present, and reasonably foreseeable future actions described in Section 5.3 would result in significant cumulative impacts to biological resources, including the desert tortoise and its habitat.

While climate change is not a future action, it is an ongoing phenomenon that would also significantly impact biological resources, also including the desert tortoise and its habitat. A wide-scale analysis developed and presented at three conferences by Sinervo (2015) predicted that, due to ongoing climate change, the Ivanpah Valley and areas near California City, California are the only areas that would offer refugia for desert tortoises in 2080, assuming no additional renewable energy developments would be constructed in the desert. If renewable energy projects are constructed, such climate change impacts would occur sooner (by 2050) due to the excess heat that these projects would generate.

Barrows et al. (2016) conducted a more specific case study of potential climate change refugia within 6.2 miles (10 km) of the Combat Center based on fine-scale habitat suitability modeling. They projected that the maximum end-of-the-century summer temperatures could reduce the area of tortoise habitat by 55%, to 315,429 acres (127,650 ha) within their study area. While this represents a significant reduction in suitable habitat, much of the refugia area overlapped the currently suitable tortoise habitat model. Although Barrows et al. (2016) is helpful in analyzing impacts to desert tortoise due to climate change, it must be noted that it is a statistical model and that, like all models, it does not perfectly represent reality and therefore should not be taken as being 100% accurate. For example, the model predicts that the recipient SEA Special Use Area does not contain any habitat suitable for desert tortoises under current conditions, when this is known to be suitable habitat (Figure 5.4-1). The same is generally true for the other recipient areas around the Combat Center's northwestern boundary that are shown as having only a patchy mosaic of suitable habitat, except for the Ord-Rodman recipient area which is shown as being at or nearly completely suitable. Should the No-Action Alternative be selected, it is expected that the future, final translocation plan that would be developed would select specific recipient sites that contain high quality habitat.

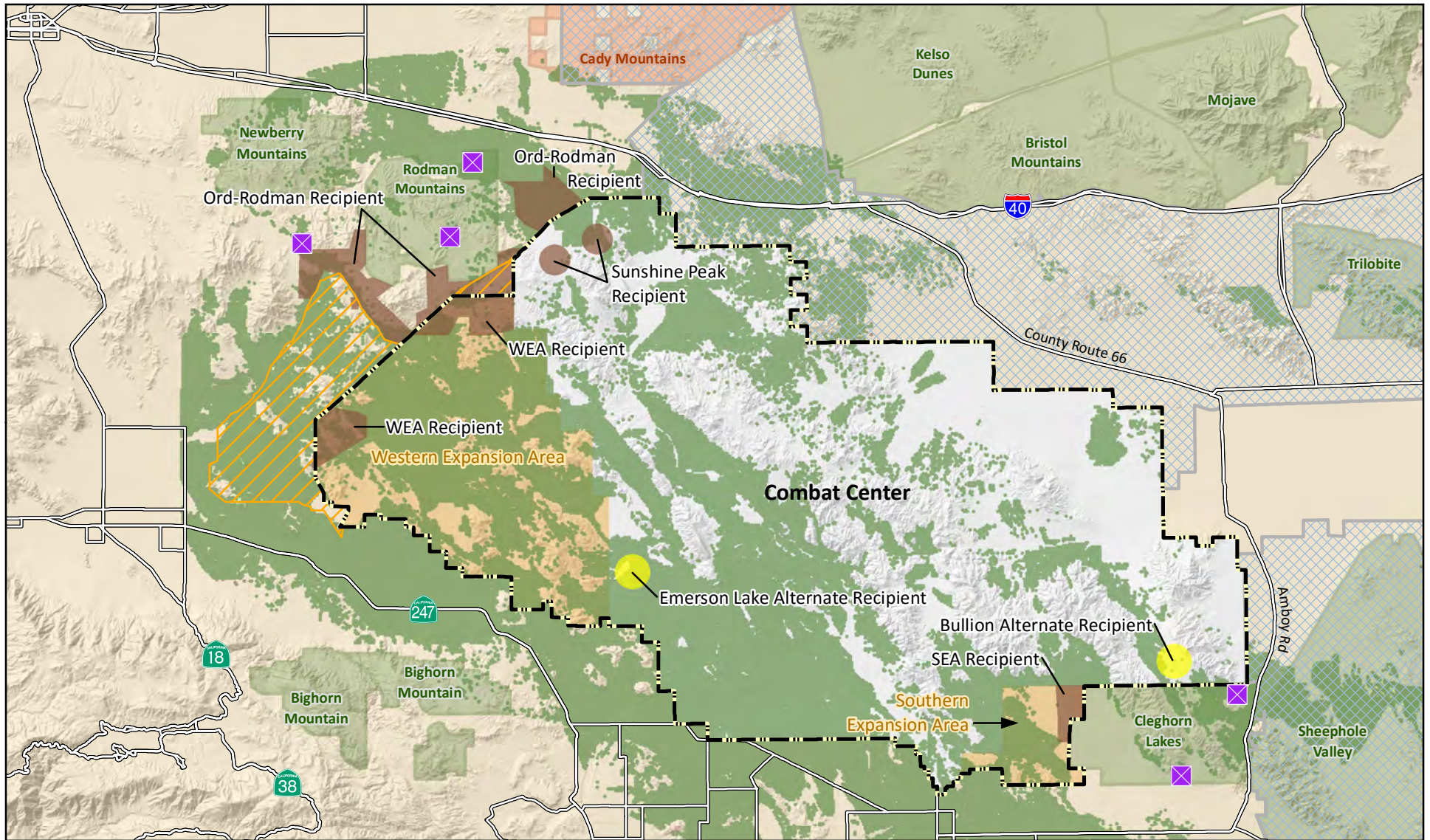
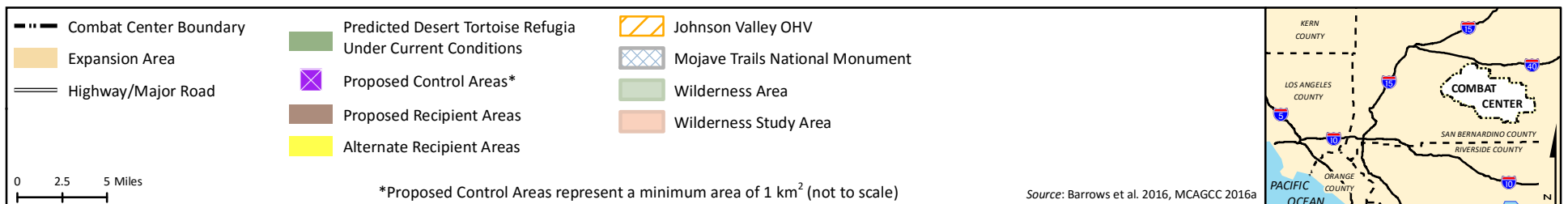


Figure 5.4-1. Predicted Desert Tortoise Refugia Under Current Conditions and the No-Action Alternative



Under a 1°C increase in summer temperatures, predicted climate change refugia are significantly reduced but still occur in a mosaic patchwork throughout the recipient areas along the Combat Center's northwestern boundary (Figure 5.4-2). Under a 3°C increase in summer temperatures, predicted climate change refugia are reduced further and shift among the proposed recipient areas (Figure 5.4-3). For example, compared to a 1°C increase in summer temperatures, refugia disappear from the eastern Ord-Rodman and eastern Sunshine Peak recipient areas but appear in the western Sunshine Peak recipient area and expand their distribution in the western Ord-Rodman recipient areas.

Based on the results from Barrows et al. (2016), climate change is expected to result in a significant impact to biological resources, including the desert tortoise and its habitat, which would be in addition to the significant cumulative impacts that would occur as a result of the past, present, and reasonably foreseeable future actions described in Section 5.3. No mitigations have been identified to address this impact.

5.4.1.2 Alternative 1

Vegetation

Under Alternative 1, a relatively limited acreage of vegetation (less than half of 1% of the project area) would be affected by ground-disturbing activities (e.g., fence installation and road construction; see Section 4.1.3.1) that, with the implementation of proposed SCMs (Section 2.6), would result in a less than significant impact to vegetation on a project-level basis. However, the past, present, and reasonably foreseeable future actions (particularly renewable energy development projects) described in Section 5.3 would result in significant cumulative impacts to vegetation. No mitigations have been identified to address this impact.

Desert Tortoise

Similar to the No-Action Alternative, impacts to biological resources under Alternative 1 would be less than significant on a project-level basis, but the past, present, and reasonably foreseeable future actions described in Section 5.3 would result in significant cumulative impacts to biological resources, including the desert tortoise and its habitat.

Figure 5.4-4 predicts that many of the proposed recipient sites contain habitat that is currently suitable. While it is expected that some patches of these recipient sites would be less suitable, particularly in the Siberia recipient site, the model results further illustrate the difficulties of attempting to model future climate change scenarios, since the proposed recipient sites were selected because they contain high quality habitat. The fact that the model predicts large portions of the Rodman-Sunshine Peak North, Cleghorn, and Bullion recipient sites indicates the model may be faulty. Moreover, it should be noted that the western half of the Lucerne-Ord recipient site, and the entire Broadwell recipient site, fall outside of the area modeled; as such, the absence of predicted quality habitat in these areas is not necessarily because the model predicted none are located there.

Similar to the No-Action Alternative and as shown on Figure 5.4-5, under a 1°C increase in summer temperatures, predicted climate change refugia under Alternative 1 are significantly reduced but still occur in a mosaic patchwork throughout the recipient sites shown on Figure 5.4-4. One exception is the Siberia recipient site, which generally is not predicted to contain tortoise refugia in this climate change scenario. Under a 3°C increase in summer temperatures, predicted climate change refugia are reduced to tiny fragments within all recipient sites except the southern portion of the Rodman-Sunshine Peak North recipient site (Figure 5.4-6).

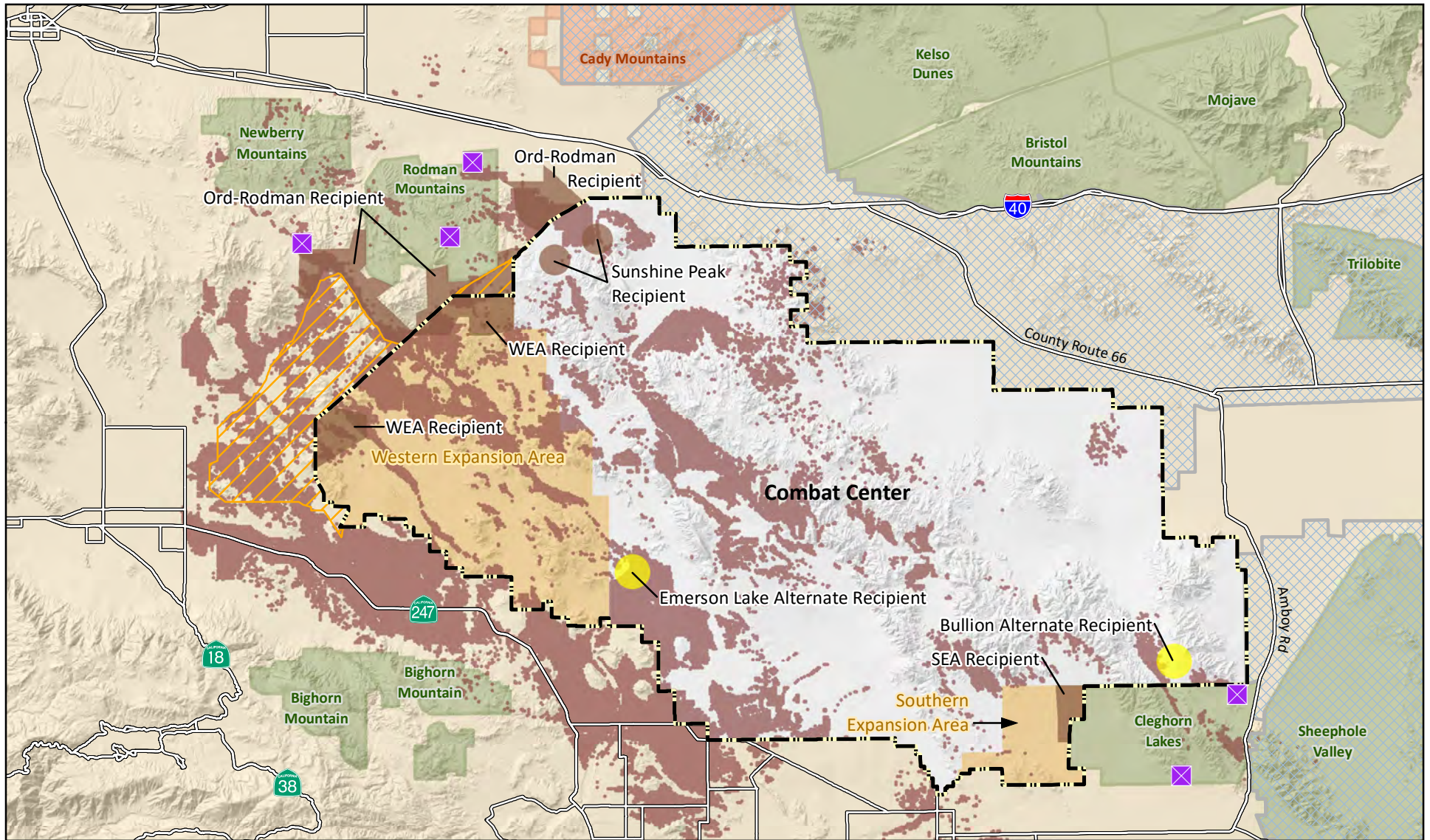
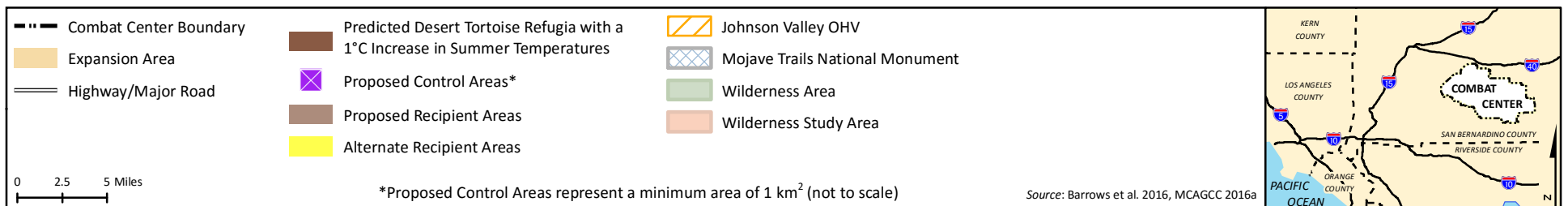


Figure 5.4-2. Predicted Desert Tortoise Refugia with a 1°C Increase in Summer Temperatures and the No-Action Alternative



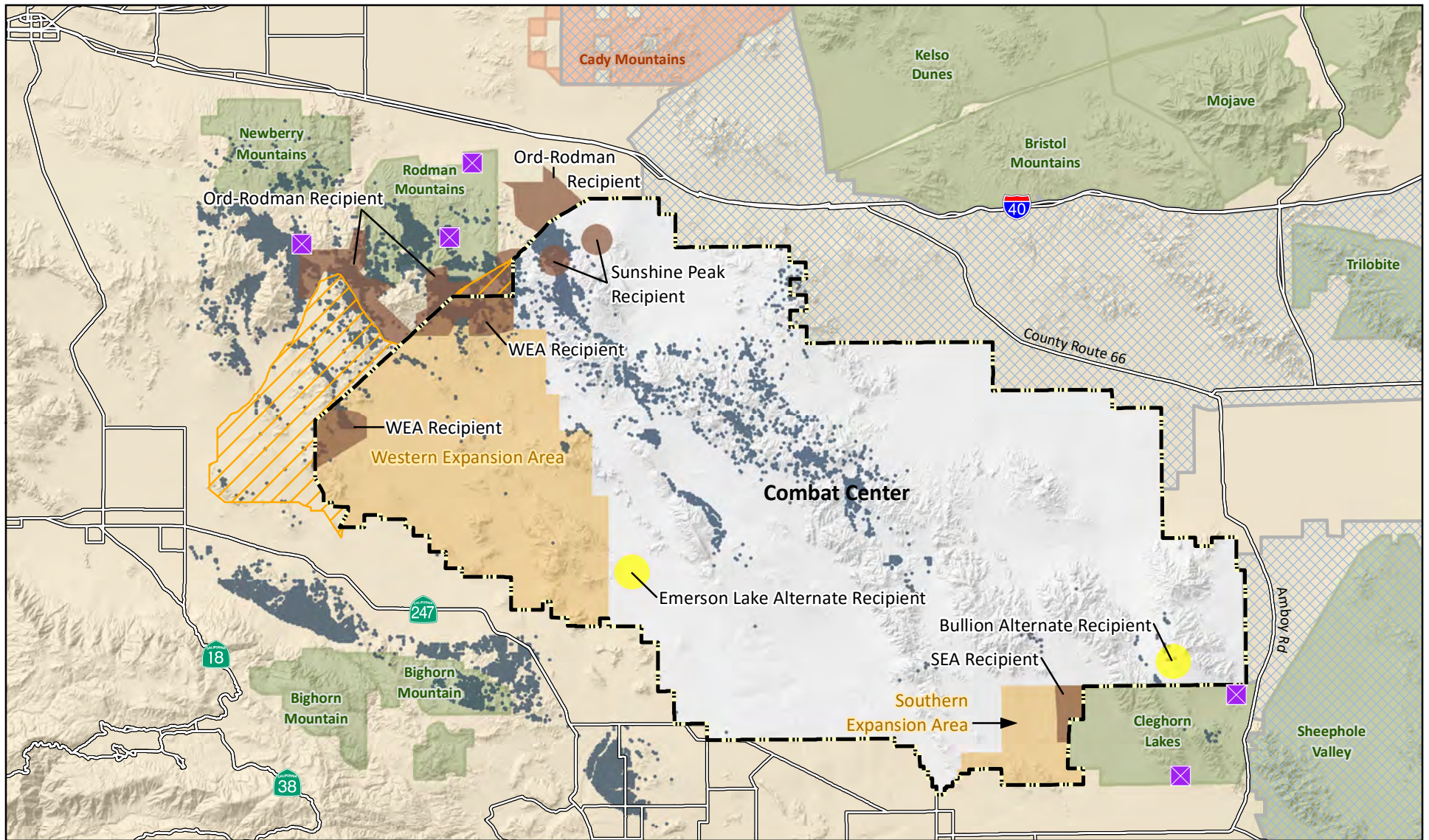
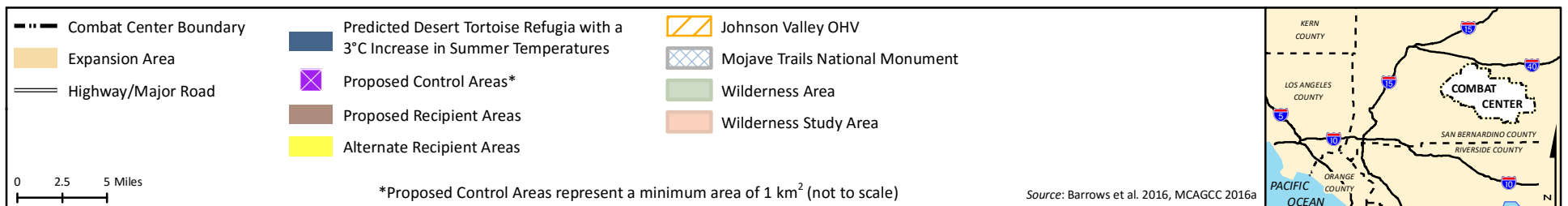


Figure 5.4-3. Predicted Desert Tortoise Refugia with a 3°C Increase in Summer Temperatures and the No-Action Alternative



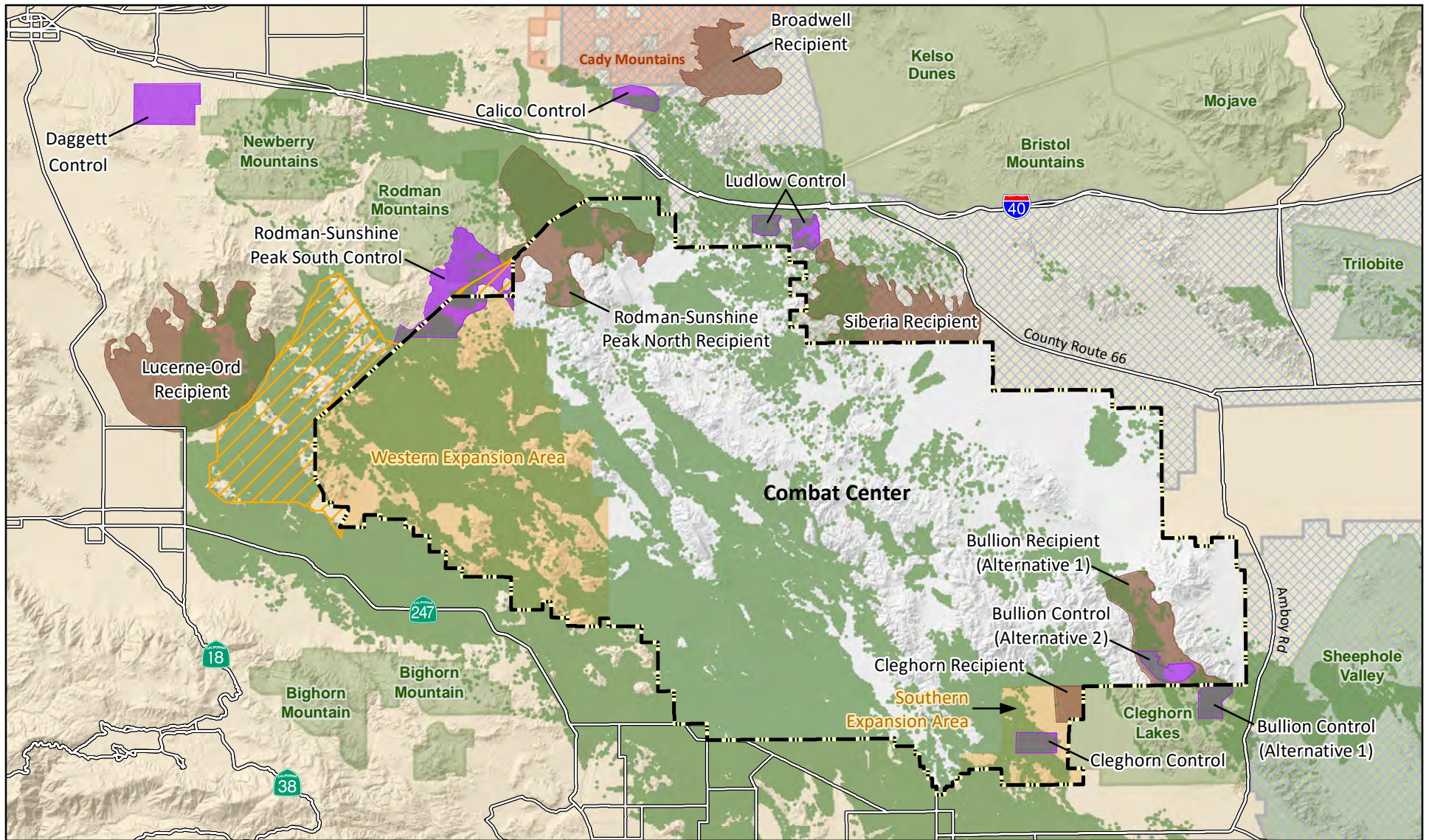
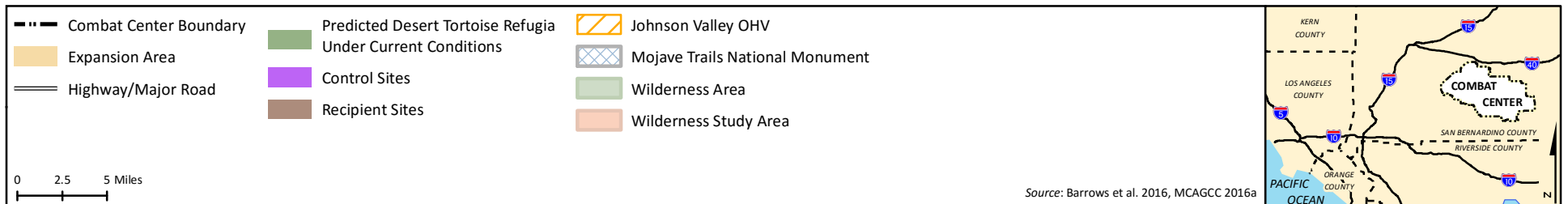


Figure 5.4-4. Predicted Desert Tortoise Refugia Under Current Conditions and Alternatives 1 and 2



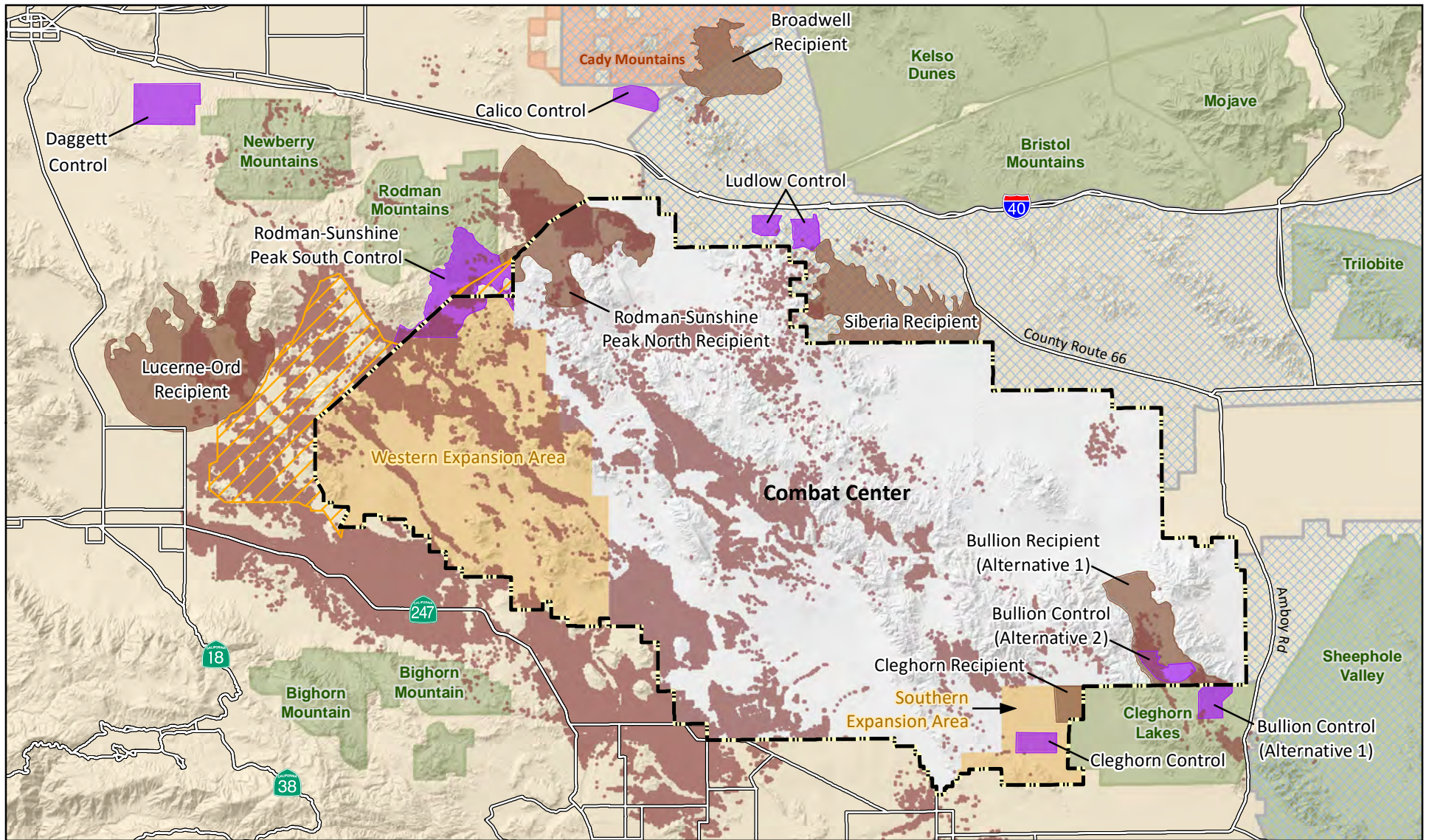
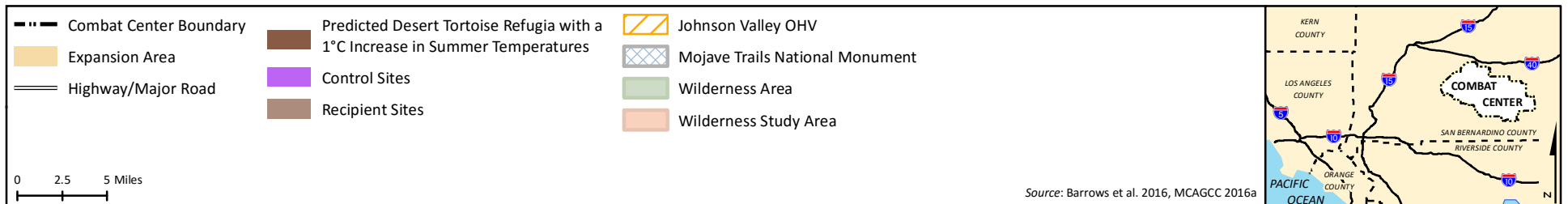


Figure 5.4-5. Predicted Desert Tortoise Refugia with a 1°C Increase in Summer Temperatures and Alternatives 1 and 2



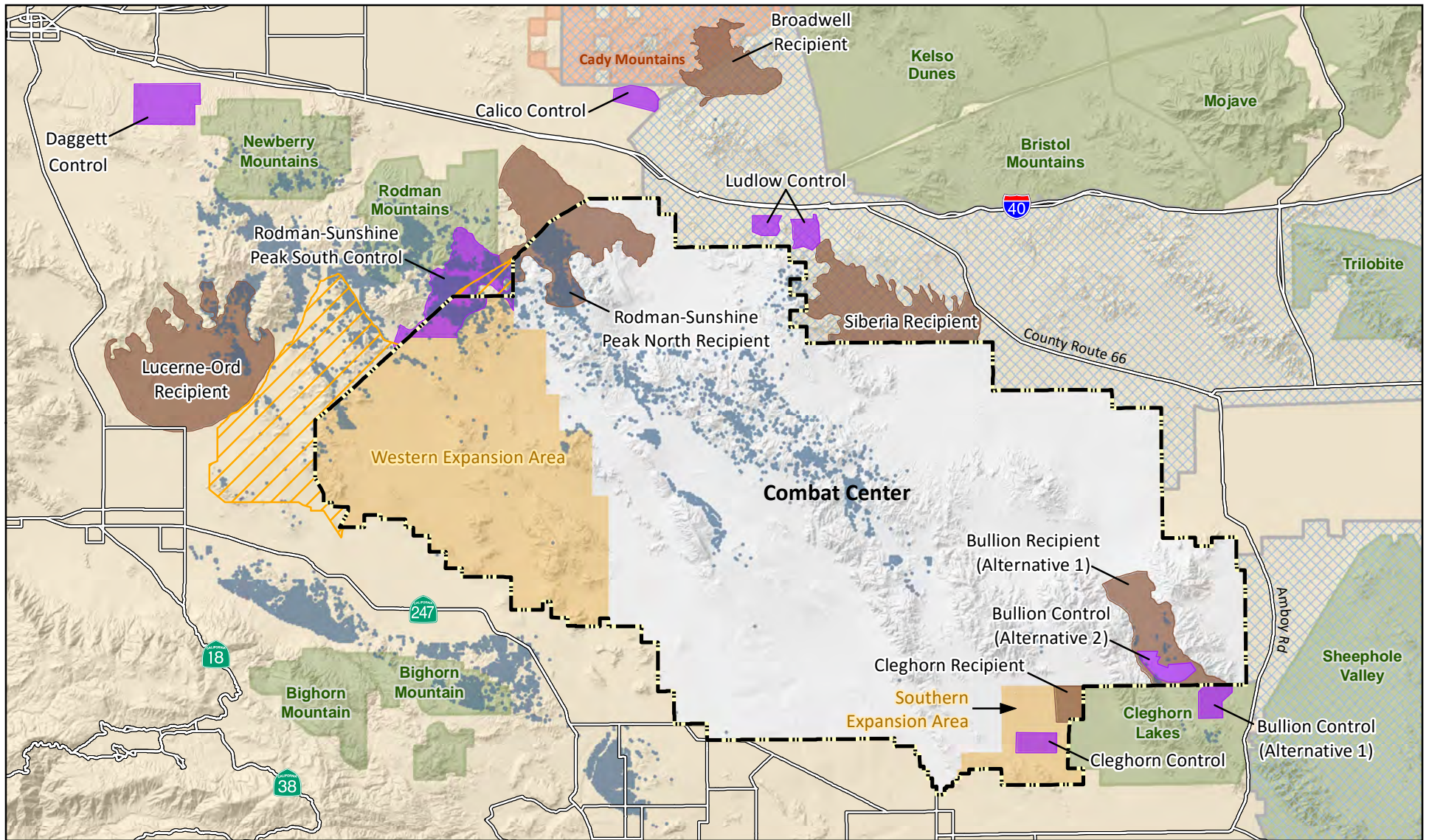
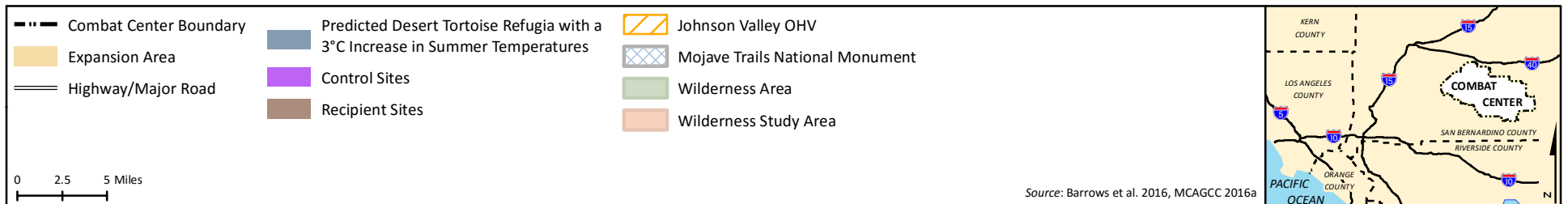


Figure 5.4-6. Predicted Desert Tortoise Refugia with a 3°C Increase in Summer Temperatures and Alternatives 1 and 2



Based on the results from Barrows et al. (2016), climate change is expected to result in a significant impact to biological resources, including the desert tortoise and its habitat, which would be in addition to the significant cumulative impacts that would occur as a result of the past, present, and reasonably foreseeable future actions described in Section 5.3. No mitigations have been identified to address this impact.

5.4.1.3 Alternative 2

Vegetation

Under Alternative 2, a relatively limited acreage of vegetation (less than half of 1% of the project area) would be affected by ground-disturbing activities (e.g., fence installation and road construction; see Section 4.1.4.1) that, with the implementation of proposed SCMs (Section 2.6), would result in a less than significant impact to vegetation on a project-level basis. However, the past, present, and reasonably foreseeable future actions (particularly renewable energy development projects) described in Section 5.3 would result in significant cumulative impacts to vegetation. No mitigations have been identified to address this impact.

Desert Tortoise

With respect to cumulative impacts, the only difference between Alternative 1 and Alternative 2 is the removal of the Bullion recipient site. As such, impacts to the desert tortoise and its Alternative 2 would be less than significant on a project-level basis, but the past, present, and reasonably foreseeable future actions described in Section 5.3 would result in significant cumulative impacts. In addition, based on the results from Barrows et al. (2016), climate change is expected to also have a significant impact to the desert tortoise and its habitat that would be in addition to that which would occur as a result of the past, present, and reasonably foreseeable future actions described in Section 5.3. No mitigations have been identified to address this impact.

5.4.2 Land Use

5.4.2.1 No-Action Alternative

Plans and Policies

Under the No-Action Alternative, the fencing of one recipient area in the WEA that overlaps the Shared Use Area would be inconsistent with the intent of the NDAA and the Johnson Valley OHV Area Management Plan, resulting in a significant but mitigable project impact. However, the No-Action Alternative would be consistent with other existing plans and policies, and the project impact to the NDAA and Johnson Valley OHV Management Plan is not indicative of a broader, cumulative impact with regard to these documents. Cumulative impacts related to plans and policies would be less than significant.

Land Ownership Status

The No-Action Alternative would not result in any change in land ownership status or require any additional land use restrictions. The additive effect of past, present, and reasonably foreseeable actions on land ownership status (together with the No-Action Alternative) is expected to be less than significant on a regional basis.

Specific Land Uses

Recreation and Off-Highway Vehicle Use

The proposed desert tortoise exclusion fence that would surround the recipient area in the WEA under the No-Action Alternative would cut-off OHV access to part of the Means Lake (Shared Use Area) Training Area, resulting in a significant impact to recreation. On a project-level, this impact could be mitigated to be less than significant with implementation of potential mitigation measure LU-1, which would adjust tortoise translocation and fencing to occur only in the exclusive military use area (as described in Section 4.2.2.1). However, cumulative impacts to recreation would continue to be significant because of the additive effect of past, present, and reasonably foreseeable actions, including reductions in land set aside for recreational activities (e.g., the 2012 Final EIS's reduction in Johnson Valley OHV Area), and increases in population that drive larger numbers of people seeking recreational opportunities. No additional mitigations have been identified to address this impact.

Grazing

The Ord-Rodman recipient areas and two control areas are located within the active Ord Mountain Grazing Allotment (cattle). Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment. While land use impacts related to incompatibility with grazing are considered to be less than significant at a project level, impacts would be cumulatively significant due to the continuing loss of rural agricultural/grazing lands to other uses including urban development, natural resources development, resource protection and conservation, outdoor recreation, and military uses. No mitigations have been identified to address this impact.

Conservation Areas

Through coordination with the BLM, proposed translocation efforts and post-translocation monitoring at recipient and control areas would be consistent with the management plans for the two ACECs that would overlap the proposed action, and no significant impacts are anticipated. Other cumulative actions would be required to do the same. In addition, other cumulative actions (e.g., Mojave Trails National Monument and the CDCRA and CMORCA) have already designated or will designate new conservation areas in the project area. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.

Wilderness Areas

As per the evaluation of No-Action Alternative impacts to wilderness areas provided in Section 4.2.2.3, no recipient areas for tortoise translocation would be located within wilderness areas or wilderness study areas. The periodic research visits by Authorized Biologists to any control areas located in wilderness areas would occur on foot only and would minimize ground disturbance. Fencing would only be installed on Combat Center land outside the boundary of the Cleghorn Lakes Wilderness Area and would be designed for minimal visual impact from within the wilderness area. Four SCMs have been identified in Section 2.6 (including a BLM Minimum Requirements Analysis) that would help to ensure that the proposed activities in wilderness areas would be consistent with BLM management goals and responsibilities, and that the values/characteristics of wilderness areas would not be diminished by the proposed action. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.

5.4.2.2 Alternative 1

Plans and Policies

The proposed tortoise translocation activities under Alternative 1 would be consistent with existing plans and policies, but in conjunction with other past, present, and reasonably foreseeable actions, cumulative impacts related to plans and policies would be less than significant.

Land Ownership Status

Alternative 1 would not result in any change in land ownership status or require any additional land use restrictions. The additive effect of past, present, and reasonably foreseeable actions on land ownership status (together with Alternative 1) is expected to be less than significant on a regional basis.

Specific Land Uses

Recreation and Off-Highway Vehicle Use

The proposed translocation of desert tortoises and post-translocation monitoring at recipient and control sites under Alternative 1 would have a negligible effect on recreation in wilderness areas or the Johnson Valley OHV Recreation Area. However, cumulative impacts to recreation would continue to be significant because of the additive effect of past, present, and reasonably foreseeable actions, including reductions in land set aside for recreational activities (e.g., the 2012 Final EIS's reduction in Johnson Valley OHV Area), and increases in population that drive larger numbers of people seeking recreational opportunities. No mitigations have been identified to address this impact.

Grazing

The Lucerne-Ord and Rodman-Sunshine Peak North recipient sites and the Rodman-Sunshine Peak South control site are located within the active Ord Mountain Grazing Allotment (cattle). Sufficient forage and access are available in the remaining portions of the Ord Mountain Grazing Allotment. While land use impacts related to incompatibility with grazing are considered to be less than significant at a project level, impacts would be cumulatively significant due to the continuing loss of rural agricultural/grazing lands to other uses including urban development, natural resources development, resource protection and conservation, outdoor recreation, and military uses. No mitigations have been identified to address this impact.

Conservation Areas

Through coordination with the BLM, translocation efforts (including helicopter use) and post-translocation monitoring at recipient and control sites would be consistent with the management plans for affected ACECs and the Mojave Trails National Monument, and no significant impacts are expected to occur. Other cumulative actions would be required to do the same. In addition, other cumulative actions (e.g., Mojave Trails National Monument and the CDCRA and CMORCA) have already designated or will designate new conservation areas in the project area. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.

Wilderness Areas

As per the evaluation of Alternative 1 impacts provided in Section 4.2.3.3, impacts of the project to wilderness areas would be less than significant. Fencing would only be installed on Combat Center land outside the boundary of the Cleghorn Lakes Wilderness Area and would be designed for minimal indirect visual impact from within the wilderness area. The periodic research visits by Authorized Biologists to wilderness areas would occur on foot only and would minimize ground disturbance. Four SCMs

identified in Section 2.6 would help to ensure that the proposed activities in wilderness areas would be consistent with BLM management goals and responsibilities, and that the values/characteristics of wilderness areas would not be diminished by the proposed action. Therefore, the proposed action would not contribute to cumulative impacts related to conservation areas, which would remain less than significant.

5.4.2.3 Alternative 2

Cumulative impacts under Alternative 2 would be essentially the same as those described for Alternative 1.

5.4.3 Air Quality

The MDAB comprises the project area for this air quality cumulative effects analysis.

5.4.3.1 No-Action Alternative

Criteria Pollutants

Construction and operation of the No-Action Alternative would cause less than significant impacts to air quality. However, potential cumulative impacts could result from short-term air emissions from trucks and vehicles used during the proposed action, in combination with other active or ongoing projects generating emissions in the vicinity of the No-Action Alternative. All of the cumulative projects listed in Section 5.3 would be required to conform to the CAA General Conformity Rule requirements and the MDAB SIP. Therefore, the cumulative projects are not anticipated to produce significant amounts of air emissions, and the potential combined emissions from the proposed action would result in less than significant cumulative impacts to air quality under the No-Action Alternative.

Greenhouse Gases

The potential effects of GHG emissions are by nature global and cumulative and it is impractical to attribute climate change to individual activities. Therefore, an appreciable impact to global climate change would only occur when GHG emissions associated with the proposed action or action alternatives are combined cumulatively with GHG emissions from other human-made activities on a global scale.

The August 2016 final guidance published by the CEQ provides information on when and how federal agencies should consider the effects of GHG emissions and climate change in their projects. In the analysis of the direct effects of a proposed action, the CEQ proposes that it would be appropriate to (1) quantify cumulative emissions over the life of the project; (2) discuss measures to reduce GHG emissions, including consideration of reasonable alternatives; and (3) qualitatively discuss the link between such GHG emissions and climate change. Therefore, formulating significance criteria for GHG emissions is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change.

Table 5.4-1 summarizes the annual GHG emissions that would occur with implementation of the No-Action Alternative.

Table 5.4-1. Estimated Annual GHG Emissions under the No-Action Alternative

Scenario/Activity	Metric tons per year CO ₂	Metric tons per year CH ₄	Metric tons per year N ₂ O	Metric tons per year CO ₂ e ¹
Construction Emissions	98.2810	0.0277	0.0000	98.8626

Legend: CH₄ = methane; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; N₂O = nitrous oxide.

Note: ¹CO₂e = CO₂ + (21 * CH₄) + (310 * N₂O).

As an indication of the nominal relative magnitude of these emissions, total annual CO₂e emissions in the U.S. were approximately 6,870 million metric tons (USEPA 2014). The annual GHG emissions during the lifespan of the No-Action Alternative project would be approximately 0.0000014% of the total annual emissions of the entire U.S. The proposed action would have a negligible effect on global climate change.

Potentially cumulative projects in the vicinity of the proposed action (listed in Section 5.3) could also release a nominal amount of GHGs from construction and operation activities when compared to the total annual CO₂e emissions in the U.S. Also, in response to Department of Defense directives such as EO 13221 *Energy Efficient Standby Power Devices* and EO 13693 *Planning for Federal Sustainability in the Next Decade*, the DON has taken a number of steps to reduce GHG emissions from their activities. These actions include developing energy efficient technologies and weapons systems, improving military and civilian vehicles fuel efficiency, utilizing alternative fuel vehicles and electric vehicles, improving energy efficiency, and installing solar and other renewable energy sources at military facilities. Therefore, when GHG impacts from the No-Action Alternative are added to the GHG impacts from the cumulative projects, there would be less than significant GHG cumulative impacts to global climate change.

5.4.3.2 Alternative 1

Criteria Pollutants

Construction and operation of Alternative 1 would cause less than significant impacts to air quality. However, potential cumulative impacts could result from short-term air emissions from trucks, vehicles, and helicopters used during the construction of the proposed action. All of the cumulative projects listed in Section 5.3 would be required to conform to the CAA General Conformity Rule requirements and the MDAB SIP. Therefore, the cumulative projects are not anticipated to produce significant amounts of air emissions, and the potential combined emissions from the proposed action would result in less than significant cumulative impacts to air quality under Alternative 1.

Greenhouse Gases

Table 5.4-2 summarizes the annual GHG emissions that would occur with implementation of Alternative 1.

Table 5.4-2. Estimated Annual GHG Emissions under Alternative 1

Scenario/Activity	Metric tons per year CO ₂	Metric tons per year CH ₄	Metric tons per year N ₂ O	Metric tons per year CO ₂ e ¹
Construction Emissions	98.2810	0.0277	0.0000	98.8626
Helicopter Emissions	63.9413	NA	NA	63.9413
Total Emissions	162.2223	0.0277	0.0000	162.8039

Legend: CH₄ = methane; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; N₂O = nitrous oxide; NA = Not Applicable.

Note: ¹CO₂e = CO₂ + (21 * CH₄) + (310 * N₂O).

As an indication of the nominal relative magnitude of these emissions, total annual CO₂e emissions in the U.S. were approximately 6,870 million metric tons (USEPA 2014). The annual GHG emissions during the lifespan of Alternative 1 would be approximately 0.0000024% of the total annual emissions of the entire U.S. The proposed action would have a negligible effect on global climate change. There would also be a negligible (insignificant) effect on the project from future climate change effects, since the construction and vehicle/helicopter activities have a short time span (2 months) in comparison to any global air quality effects from rising GHG concentrations.

Potentially cumulative projects in the vicinity of the proposed action (listed in Section 5.3) could also release a nominal amount of GHGs from construction and operation activities when compared to the total annual CO₂e emissions in the U.S. Also, the measures taken by the Department of Defense to reduce GHG emissions in response to EOs 13221, 13693, and other directives would still be in effect if Alternative 1 was selected. Therefore, when GHG impacts from Alternative 1 are added to the GHG impacts from the cumulative projects, there would be less than significant GHG cumulative impacts to global climate change.

5.4.3.3 Alternative 2

Criteria Pollutant and GHG emissions from Alternative 2 would be similar to Alternative 1. Table 5.4-3 summarizes the annual GHG emissions that would occur with implementation of Alternative 2.

Table 5.4-3. Estimated Annual GHG Emissions under Alternative 2

Scenario/Activity	Metric tons per year CO ₂	Metric tons per year CH ₄	Metric tons per year N ₂ O	Metric tons per year CO ₂ e ¹
Construction Emissions	98.2810	0.0277	0.0000	98.8626
Helicopter Emissions	63.9413	NA	NA	63.9413
Total Emissions	162.2223	0.0277	0.0000	162.8039

Legend: CH₄ = methane; CO₂ = carbon dioxide; CO₂e = carbon dioxide equivalent; N₂O = nitrous oxide; NA = Not Applicable.

Note: ¹CO₂e = CO₂ + (21 * CH₄) + (310 * N₂O).

The annual GHG emissions during the lifespan of Alternative 2 would be the same as Alternative 1, or approximately 0.0000024% of the total annual emissions of the entire U.S. Therefore, when criteria pollutant and GHG impacts from Alternative 2 are added to the GHG impacts from the cumulative projects, there would be less than significant GHG cumulative impacts to global climate change.

5.4.4 Cultural Resources

Cumulative effects to cultural resources, taken as an aggregate within the project area, result from past, present, and future actions that destroy these resources or degrade or diminish the qualities that make them significant, especially those characteristics and attributes that make them eligible for listing in the NRHP or that are considered important in maintaining the culture of Native American Tribes. Effects to cultural resources generally (but not exclusively) result from physical impacts to the ground surface. These can include OHV traffic, land and energy development, and traffic resulting from land-based military maneuvers.

5.4.4.1 No-Action Alternative

As described in Section 4.4.2, with the implementation of SCMs there would be no direct or indirect impacts to historic properties under the No-Action Alternative. Accordingly, the proposed action under the No-Action Alternative has no potential to contribute to cumulative impacts on historic properties.

With respect to impacts on the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes, the SEIS analysis found less than significant impacts under the No-Action Alternative. Although the impacts from the No-Action Alternative are less than significant, they do contribute to the aggregate effects of other past, present, and foreseeable future actions on this landscape, which are cumulatively significant. Should the actions implemented as part of the 2011 GTP (No-Action Alternative) result in higher densities and better health of the regional tortoise population, the impacts of the proposed action would be beneficial and counteract some of the aggregate negative impacts.

5.4.4.2 Alternative 1

With the implementation of SCMs, no direct or indirect impacts to historic properties would occur under Alternative 1. Accordingly, the proposed action under Alternative 1 has no potential to contribute to cumulative impacts on historic properties.

With respect to impacts on the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes, the SEIS analysis found less than significant impacts related to the implementation of Alternative 1. Although the impacts from Alternative 1 are less than significant, they do contribute to the aggregate effects of other past, present, and foreseeable future actions on this landscape, which are cumulatively significant. Should the actions implemented as part of the March 2016 Translocation Plan (Alternative 1) result in higher densities and better health of the regional tortoise population, the impacts of the proposed action would be beneficial and counteract some of the aggregate negative impacts.

5.4.4.3 Alternative 2

With the implementation of SCMs, no direct or indirect impacts to historic properties would occur under Alternative 2. Accordingly, the proposed action under Alternative 2 has no potential to contribute to cumulative impacts on historic properties.

With respect to impacts on the desert tortoise as a part of the cultural and spiritual landscape of the Colorado River Indian Tribes, the SEIS analysis found less than significant impacts related to the implementation of Alternative 2. Although the impacts from Alternative 2 are less than significant, they do contribute to the aggregate effects of other past, present, and foreseeable future actions on this landscape, which are cumulatively significant. Should the actions implemented as part of the June 2016 Translocation Plan (Alternative 2) result in higher densities and better health of the regional tortoise population, the impacts of the proposed action would be beneficial and counteract some of the aggregate negative impacts.

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CHAPTER 6

OTHER NEPA CONSIDERATIONS

This chapter addresses additional considerations required by NEPA and possible conflicts between the action and the objectives of land use plans, policies, and controls; irreversible and irretrievable commitment of resources; and short-term vs. long-term productivity. The cumulative impacts analysis is presented in Chapter 5.

6.1 POSSIBLE CONFLICTS BETWEEN THE PROPOSED ACTION AND THE OBJECTIVES OF LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED

The action alternatives have been assessed to determine consistency and compliance with applicable environmental regulations and other plans, policies, and controls. This analysis indicates that the action alternatives would not conflict with the objectives of applicable federal regulations, Ord Mountain Grazing Allotment, and San Bernardino County residential and open space land use designations. A summary of applicable environmental regulations and regulatory compliance is provided in Table 6.1-1.

Table 6.1-1. Summary of Compliance with Plans, Policies, and Controls

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
NEPA of 1969, as amended (42 USC § 4321- 4370h); the CEQ implementing regulations (40 CFR Parts 1500-1508); DON Procedures for Implementing NEPA (OPNAVINST 5090.1C); Marine Corps Environmental Compliance and Protection Manual (Marine Corps Order P5090.2A, change 2)	DON/Marine Corps	This SEIS has been prepared in accordance with CEQ Regulations implementing NEPA and DON/Marine Corps NEPA procedures. The preparation of this SEIS and the provision for public review are being conducted in compliance with NEPA.
EO 12372 (Intergovernmental Review of Federal Programs) 47 Federal Register 30959	DON/Marine Corps	The DON/Marine Corps are in the process of consulting with and soliciting comments from federal, state, and local officials whose jurisdictions would be affected by the federal action, consistent with this directive.
Clean Water Act, 33 USC §§ 1251 to 1387	USEPA/USACE DON/Marine Corps	All alternatives would be implemented in accordance with this act.
CAA, as amended (42 USC § 7401 <i>et seq.</i>)	USEPA	The DON is consulting with the MDAQMD regarding this action.
ESA (16 USC 1531 <i>et seq.</i>)	USFWS DON/Marine Corps	Implementation of any of the alternatives would adversely affect threatened or endangered species. The DON is consulting with the USFWS regarding this action.
MBTA (16 USC 703-712)	USFWS DON/Marine Corps	None of the alternatives would have a measurable negative effect on migratory bird populations.
EO 11990 (Protection of Wetlands) 42 Federal Register 26961	USACE DON/Marine Corps	None of the alternatives would impact wetlands (none are present in the project area) and would be in compliance with EO 11990.

Table 6.1-1. Summary of Compliance with Plans, Policies, and Controls (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Conservation Programs on Government Lands (Sikes Act) §§ 670a to 670o	DON/Marine Corps	The DON currently complies with and implements the Sikes Act through its cooperative programs with state, federal, and local resource agencies to manage natural resources, including sensitive botanical and fish and wildlife resources. The DON would continue to comply with this program with implementation of any of the alternatives.
Fish and Wildlife Conservation Act of 1980 (Nongame Act), 16 USC §§ 2901 to 2911	USFWS DON/Marine Corps	None of the alternatives would interfere with lands identified by the USFWS to foster the conservation of migratory nongame birds.
NHPA, 54 USC §§ 300101 et seq.	ACHP, SHPO DON/Marine Corps	All alternatives would be implemented in accordance with this act. The DON is consulting with the SHPO regarding this action.
Archaeological Resources Protection Act of 1979, 16 USC §§ 470aa to 470mm	ACHP, SHPO DON/Marine Corps	All alternatives would be implemented in accordance with this act. The DON is consulting with the SHPO regarding this action.
NAGPRA, 25 USC §§ 3001 to 3013	DON/Marine Corps	No objects to which NAGPRA applies are known or have been located within the project area. If human remains, associated grave goods, or other pertinent resources are uncovered during construction, all NAGPRA guidelines and regulations would be followed. This may include coordination with federally-recognized tribes and the Native American Heritage Commission.
Pollution Prevention Act of 1990, 42 USC §§ 13101-13109	DON/Marine Corps	The DON/Marine Corps currently implements procedures to comply with this act and would continue to do so with implementation of any of the alternatives.
EO 12088 (Federal Compliance with Pollution Control Standards) 43 Federal Register 47707	DON/Marine Corps	All alternatives would be implemented in accordance with this order.
Resource and Conservation Recovery Act of 1976, 42 USC §§ 6901 to 6992k	USEPA and Department of Toxic Substance Control DON/Marine Corps	All alternatives would be implemented in accordance with this act.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC §§ 9601 to 9675	DON/Marine Corps	All alternatives would be implemented in accordance with this act.
Emergency Planning and Community Right-to-Know Act of 1986, 42 USC §§ 11001 to 11050	DON/Marine Corps	All alternatives would be implemented in accordance with this act.

Table 6.1-1. Summary of Compliance with Plans, Policies, and Controls (continued)

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Uniform Fire Code (International Fire Code Institute 1997)	DON/Marine Corps	The DON/Marine Corps would require construction contractors to conform to Uniform Fire Code guidelines for appropriate construction materials to reduce fire hazards under all of the alternatives.
Noise Control Act of 1972 and Quiet Communities Act of 1978, 42 USC §§ 4901 to 4918	DON/Marine Corps	This SEIS provides due consideration to noise impacts, consistent with this act.
Wilderness Act of 1964, Public Law 88-577	BLM, USFWS, U.S. Forest Service, National Park Service	The proposed action would comply with the Act's goals of minimizing human imprint, contributing to educational and scientific value (i.e., related to desert tortoise monitoring and research), and protecting endangered species.

Legend: ACHP = Advisory Council on Historic Preservation; CEQ = Council on Environmental Quality; DON = Department of the Navy; EO = Executive Order; NAGPRA = Native American Graves Protection and Repatriation Act; NEPA = National Environmental Policy Act; NHPA = National Historic Preservation Act; SEIS = Supplemental Environmental Impact Statement; SHPO = State Historic Preservation Office(r); USACE = U.S. Army Corps of Engineers; USC = U.S. Code; USEPA = U.S. Environmental Protection Agency; USFWS = U.S. Fish and Wildlife Service.

6.2 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires a detailed statement of any irreversible and irretrievable commitments of resources that would be involved in the proposed action should it be implemented. Irreversible and irretrievable resource commitments are related to the use of non-renewable resources and the effects that the use of those resources have on future generations. Irreversible commitments of resources are those that cannot be reversed except over an extremely long period of time. These irreversible effects primarily result from destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

Implementation of any of the alternatives would involve the consumption of fuel, oil, and lubricants for the construction and maintenance phases. The materials that would be consumed for the installation and maintenance of the tortoise fencing and the energy that would be consumed for the installation, translocation, and on-going inspection and maintenance activities represents a permanent and non-renewable commitment of these resources. The majority of the fuel, oil, and lubricants consumed would occur during the construction phase. However, relatively minimal quantities of these types of resources would be required. Minor amounts of metal would be used for the fencing and signs, and would represent a non-renewable commitment of these resources.

6.3 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the environment associated with any of the alternatives include minor changes to the physical environment and negligible fuel use during construction, maintenance and monitoring activities. Activities associated with the construction of temporary and permanent tortoise exclusion fencing would involve short-term increases in combustive and fugitive emissions, construction-generated noise, and the

use of fossil fuels to power equipment. In addition, there would be expenditures of public funds and the use of labor. These effects would be temporary (approximately 2 weeks) and would not be expected to result in permanent damage or long-term changes in wildlife productivity or habitat use.

6.4 UNAVOIDABLE ADVERSE EFFECTS

An EIS must describe any unavoidable adverse environmental effects for which either no mitigation or only partial mitigation is feasible. The impact analysis presented in Chapter 4 of this SEIS demonstrates that the action alternatives would result in a range of unavoidable impacts (depending on the alternative selected) related to:

Biological resources – Under each alternative there would be a minor amount of permanent disturbance to vegetation (primarily desert scrub, given its prevalence) from installation of the exclusion fencing and associated maintenance roads on the Combat Center. To minimize impacts, the fence alignment would avoid long-lived woody and succulent vegetation; additional SCMs would also be implemented (see Section 2.6.2), and a potential mitigation measure could also be implemented (BIO-1), to further reduce these impacts. Nonetheless, there would be minor unavoidable, less than significant, adverse impacts to vegetation as a result of the fence and maintenance road construction associated with the proposed action.

Additionally, each alternative would also have adverse physical and social impacts to desert tortoises from the translocation process. Tortoises would experience stress during the translocation process (e.g., handling, transportation) and afterward until they have established a new home range. Until a new home range is established, tortoises would have a higher risk of mortality (e.g., from predation or heat), but the increased risk of mortality is small, unquantifiable, not statistically significant compared to that of resident and control tortoises, and is not a driver of desert tortoise mortality following translocation. These impacts would also be minimized by, for example, hydrating tortoises prior to release, releasing them during cooler parts of the day and year, and ensuring that all recipient sites have suitable habitat, including adequate shrub cover. In addition, SCMs would be implemented (see Section 2.6.2), and mitigation measures could be implemented, to further reduce these impacts; nonetheless, there would be minor unavoidable, less than significant, adverse impacts to desert tortoises as a result of the proposed action.

Land use – Under the No-Action Alternative, there would be a significant impact because fencing of recipient areas in the Shared Use Area is inconsistent with the intent of the NDAA and the Johnson Valley OHV Area Management Plan. There would also be a significant adverse impact to recreation and OHV use because fencing of recipient areas in the Shared Use Area would prevent access to an “open use” area.

CHAPTER 7

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APPENDIX A

DESERT TORTOISE TRANSLOCATION PLANS

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APPENDIX A-1

ADDENDUM TO THE TRANSLOCATION PLANS

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Addendum to the Translocation Plans

In general, the No-Action Alternative, Alternative 1, and Alternative 2 would implement the desert tortoise translocation as described in the 2011 General Translocation Plan (GTP), March 2016 Translocation Plan, and the June 2016 Translocation Plan, respectively. However there are several instances where the alternatives described in Chapter 2 of the Supplemental Environmental Impact Statement differ from the translocation plans provided in this appendix. These differences are due to errata in the original translocation plans or changes in project design due to new information. Table A-1 provides a list of these differences for each alternative and a reason for the changes.

Table A-1. Changes to the No-Action Alternative and Alternatives 1 and 2

Change to Alternative	Related text in Translocation Plan	Reason for Change
<i>No-Action Alternative</i>		
The areas of Ord-Rodman-combined recipient areas is corrected from 19,199 acres (77.7 km ²) to 23,475 acres (95.0 km ²). Total area for Proposed Recipient Areas corrected from 37855.5 acres (153.2 km ²) to 42,269 acres (171.1 km ²).	2011 GTP, Page 20, Table 4; Page 32, Table 7.	Erratum: area correction.
Total area for Proposed Recipient Areas corrected from “approximately 153 km ² (59 mi ² or 37,855 acres)” to “approximately 171 km ² (59 mi ² or 42,269 acres).”	2011 GTP, Page 20, Line 1.	Erratum: area correction.
Clearance surveys for tortoises and nests were conducted from September 2014 through October 2015 inside the designated medium- and high-intensity MEB operating areas in the WEA and SEA. All tortoises of adequate size were transmittered; juvenile tortoises too small to wear transmitters were moved to new holding pens at MCAGCC Natural Resources and Environmental Affairs TRACRS and these juvenile tortoises would be part of headstarting. A tortoise survey of recipient and control sites was also conducted in fall 2015.	2011 GTP, Pages 44-45, Section 3.2.2, <i>Clearance Surveys in the Acquisition Areas</i> .	Updated based on 2014 and 2015 clearance surveys; surveys were conducted as described in Section 3.2.2 of the 2011 GTP.
No change to the No-Action Alternative.	2011 GTP, Page 31, Line 2.	Erratum: correct text to read “...post-translocation maximum of 5.55 per km ² ...”
No change to the No-Action Alternative.	2011 GTP, Page 32, Table 7.	Erratum: Area for the Sunshine Peak Training Area corrected 60.5 km ² to 15km ² .
<i>Alternative 1</i>		
Remove Rodman from list of Control Sites and correct number of control tortoises for Cleghorn Control and Bullion Control from 20 to 25.	March 2016 Translocation Plan, Page 29, Table 7.	Erratum: Control Site correction.
No change to Alternative 1.	March 2016 Translocation Plan, Page 29, Table 6.	Erratum: The total “# Adults to Translocate” should be corrected from 443 to 998.
Percent change in densities revised in Section 2.2.4.1.	March 2016 Translocation Plan, Page 29, Table 6.	Errata: Density Increase: Lucerne-Ord: from 53% to 57% Rodman-Sunshine Peak North: from 37% to 36% Siberia: from 71% to 82% Broadwell: from 18% to 22% Cleghorn Recipient (constrained): from 100% to 85% Bullion Recipient: no change

Table A-1. Changes to the No-Action Alternative and Alternatives 1 and 2 (continued)

Change to Alternative	Related text in Translocation Plan	Reason for Change
The size of the Siberia recipient site has been modified in Tables 2.2-1 and 2.2-3 to represent 62% of the original 15,765 acre site that has a habitat suitability index of 0.6 or greater.	March 2016 Translocation Plan, Page 9, Table 2.	Updated because recent site visits found that substantial portions of the Siberia recipient site have been scoured by natural flooding, patchily affecting habitat value in the site.
Alternative 2		
Size and distance from recipient site for the Bullion Control has been corrected to 2,136 acres (8.6 km ²) and 4.3 miles (6.9 km), respectively in Table 2.3-1 of the SEIS.	June 2016 Translocation Plan, Page 11, Table 2.	Errata; correct the size and distance from recipient site for the Bullion Control (12 km and 15.7 km ² , respectively in Table 2).
The Bullion control site (Figure 2.3-2) would be located on the Combat Center in the SUA immediately north of Cleghorn Lakes Wilderness Area (instead of in the northwest portion of the Cleghorn Lakes Wilderness Area under Alternative 1).	June 2016 Translocation Plan, Page 14, Table 3; Figures 2b and 3f.	Errata; correct the location of the Bullion Control (identified as being "Entirely in Cleghorn Wilderness" in Table 3); Figures 2b and 3f depict incorrect location of Bullion Control and show old Bullion Recipient Site.
The size of the Siberia recipient site has been modified in Table 2.3-1 to represent 62% of the original 15,765 acre site that has a habitat suitability index of 0.6 or greater.	June 2016 Translocation Plan, Page 10, Table 2.	Updated because recent site visits found that substantial portions of the Siberia recipient site have been scoured by natural flooding, patchily affecting habitat value in the site
Translocation Densities in Table 2.2-3 of the SEIS have been updated based on changes in size of Siberia recipient site.	June 2016 Translocation Plan, Page 29, Table 6.	Updated based on change in size of Siberia recipient site.
Translocatees and Post-Translocation Densities revised in Table 2.3-2.	June 2016 Translocation Plan, Page 29, Table 6.	Errata: Translocatees: Lucerne-Ord: from 448 to 447 Rodman-Sunshine Peak North: from 316 to 341 Siberia: from 182 to 155 Broadwell: from 19 to 18 Cleghorn Recipient (constrained): from 32 to 37 Post-Translocation Densities: Lucerne-Ord: from 8 to 8.1 Rodman-Sunshine Peak North: from 8 to 8.1 Siberia: no change Broadwell: no change Cleghorn Recipient (constrained): from 10.5 to 10.4

APPENDIX A-2

2011 GENERAL TRANSLOCATION PLAN

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UNITED STATES MARINE CORPS LAND ACQUISITION AND AIRSPACE ESTABLISHMENT

GENERAL TRANSLOCATION PLAN FOR DESERT TORTOISES

Prepared for:

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December 8, 2011

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UNITED STATES MARINE CORPS LAND ACQUISITION AND AIRSPACE ESTABLISHMENT

GENERAL TRANSLOCATION PLAN FOR DESERT TORTOISES

1.0 INTRODUCTION

1.1 BACKGROUND

The Marine Corps Air Ground Combat Center at Twentynine Palms, California (the “Combat Center”) is a unique Marine Corps training installation that provides a realistic battlefield environment for live-fire maneuvers. A large-scale Marine Air Ground Task Force (MAGTF) training area would include areas on the existing Combat Center as well as additional lands west and south of the Combat Center, known as the West Study Area (WSA) and the South Study Area (SSA), respectively. Associated training would enable Marine Expeditionary Brigade (MEB)-level training exercises, involving large-scale, integrated, live-fire maneuvers. MEB training exercises and supporting activities are detailed in the *Biological Assessment for the Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training* (BA; Department of the Navy [Navy] 2011a) and, in summary, would include:

- MEB Work-up and Final training exercises involving air-ground maneuvers in the expanded training area. These would occur twice annually for a total of 48 days per year, plus 12 days of clean-up. Each would involve approximately up to 15,000 Marines, 1,786 wheeled and tracked vehicles, and 1,657 aircraft sorties (Figures 1 and 2). MEB Work-up Exercises would occur during the first 17 days of each MEB exercise, and involve individual battalion task forces taking turns conducting recurring evolutions of fire support and ground/air integration training. In the MEB Final Exercises, three battalion task forces would work abreast from separate maneuver points to converge on a single MEB objective in the western portion of the WSA (Figure 3) over 48 to 72 hours of continuous offensive operations. These battalion task forces would move in an east-to-west fashion, with two task forces assembling on the eastern portion of the Combat Center and one task force readying in the SSA.
- When MEB Work-up and Final training exercises are not occurring, MEB Building Block training exercises will occur in the WSA. These MEB Building Block training exercises would consist of four-day training evolutions, which would be repeated weekly throughout the year whenever MEB Exercises are not being conducted (an average of approximately 40 weeks or 160 days each year). These exercises would include combined arms and live-fire and maneuver with

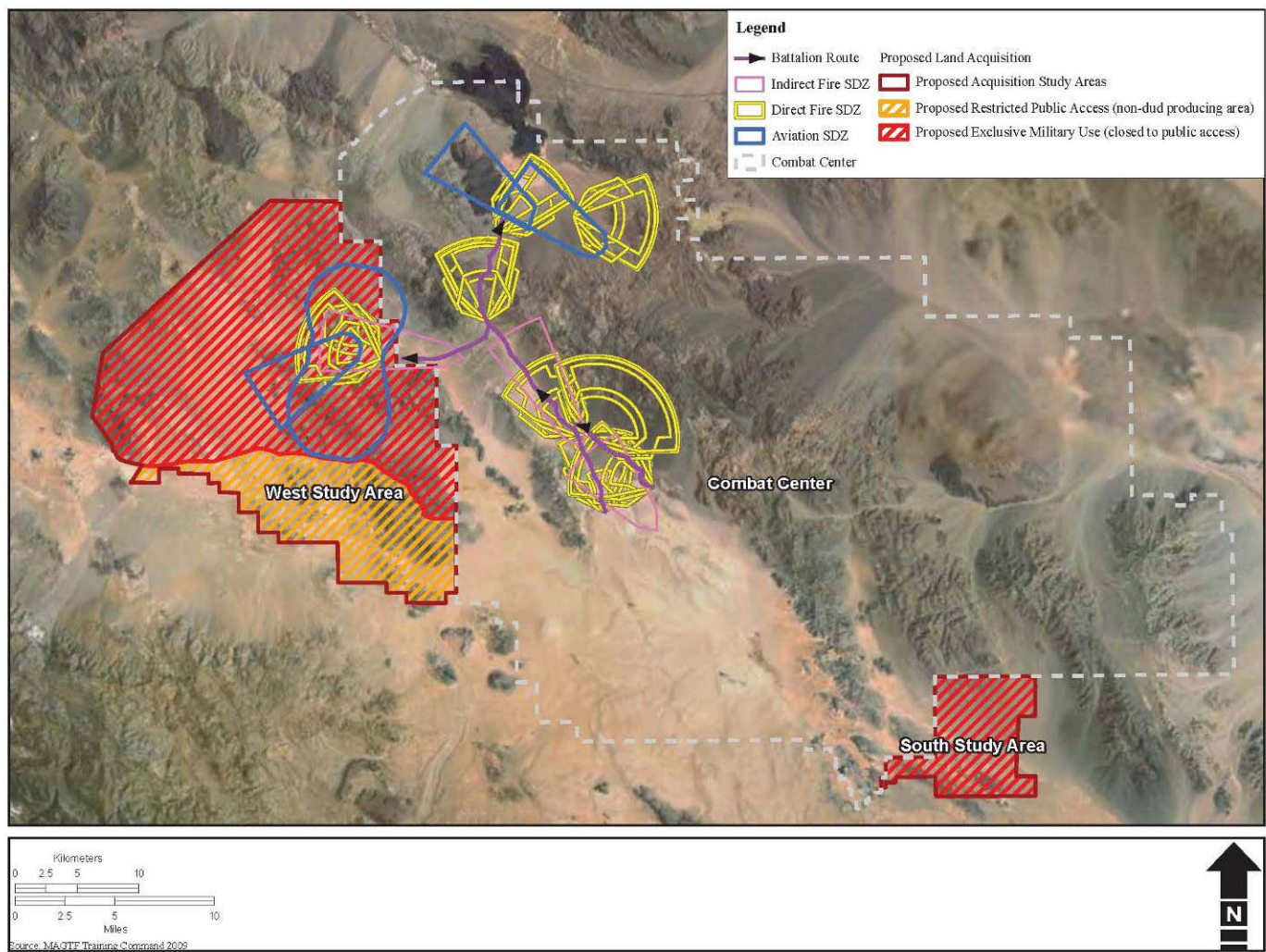


Figure 1. Representative MEB Exercise Work-up training scenario (Source: Navy 2011a)

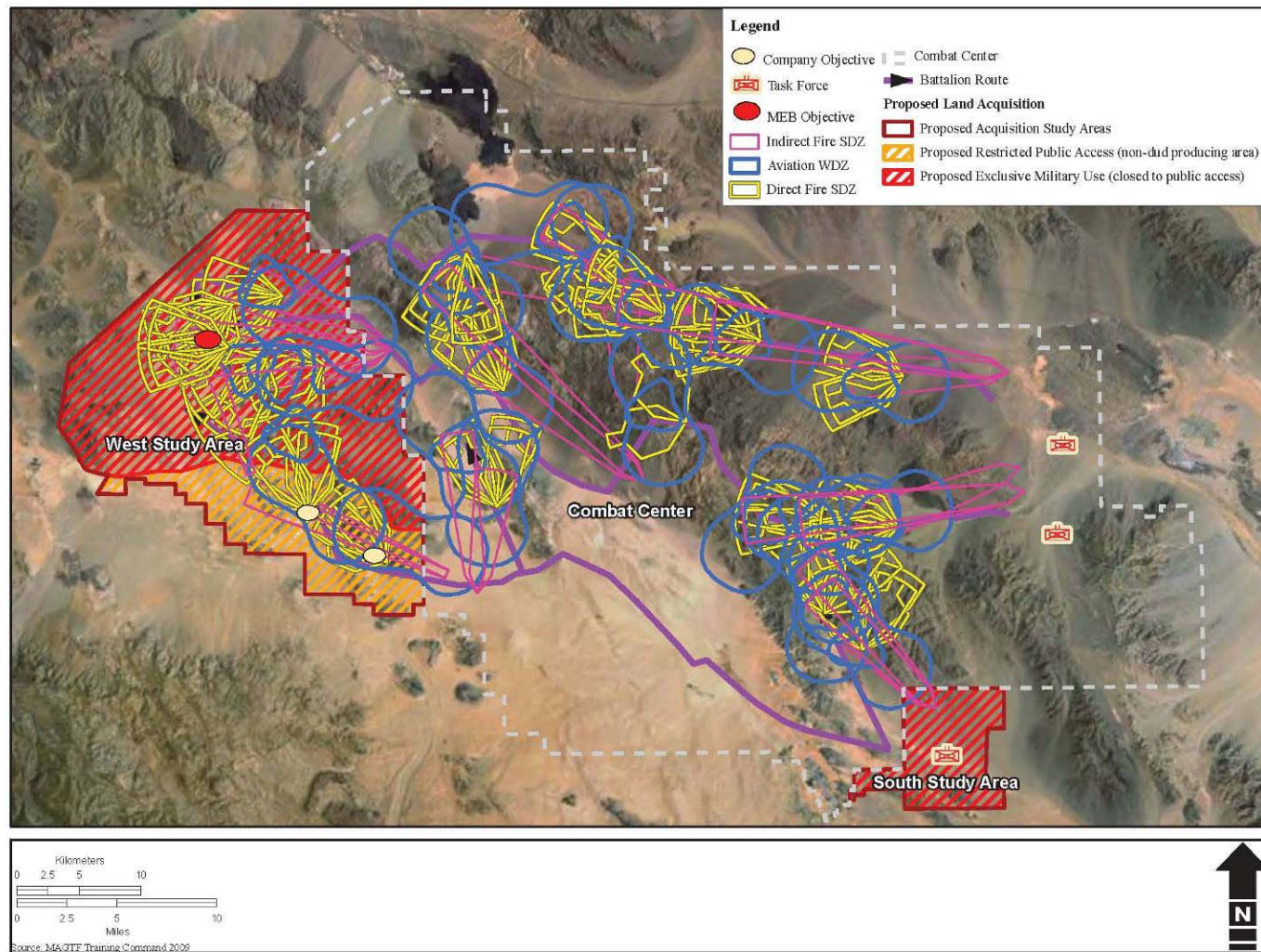


Figure 2. Representative MEB Final Exercise scenario. (Source: Navy 2011a)

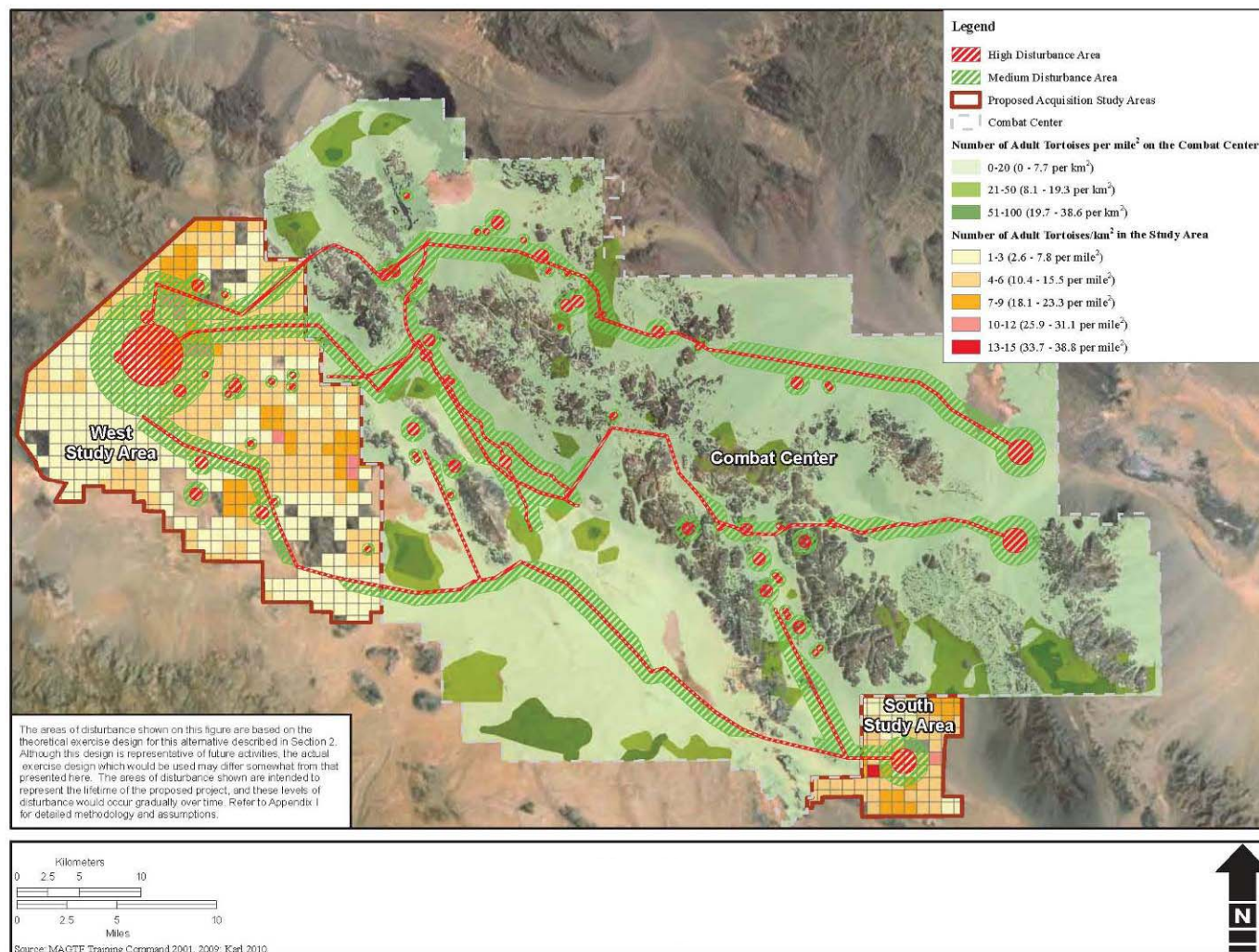


Figure 3. Estimated disturbance to desert tortoise habitat under the proposed action. (Source: Navy 2011a)

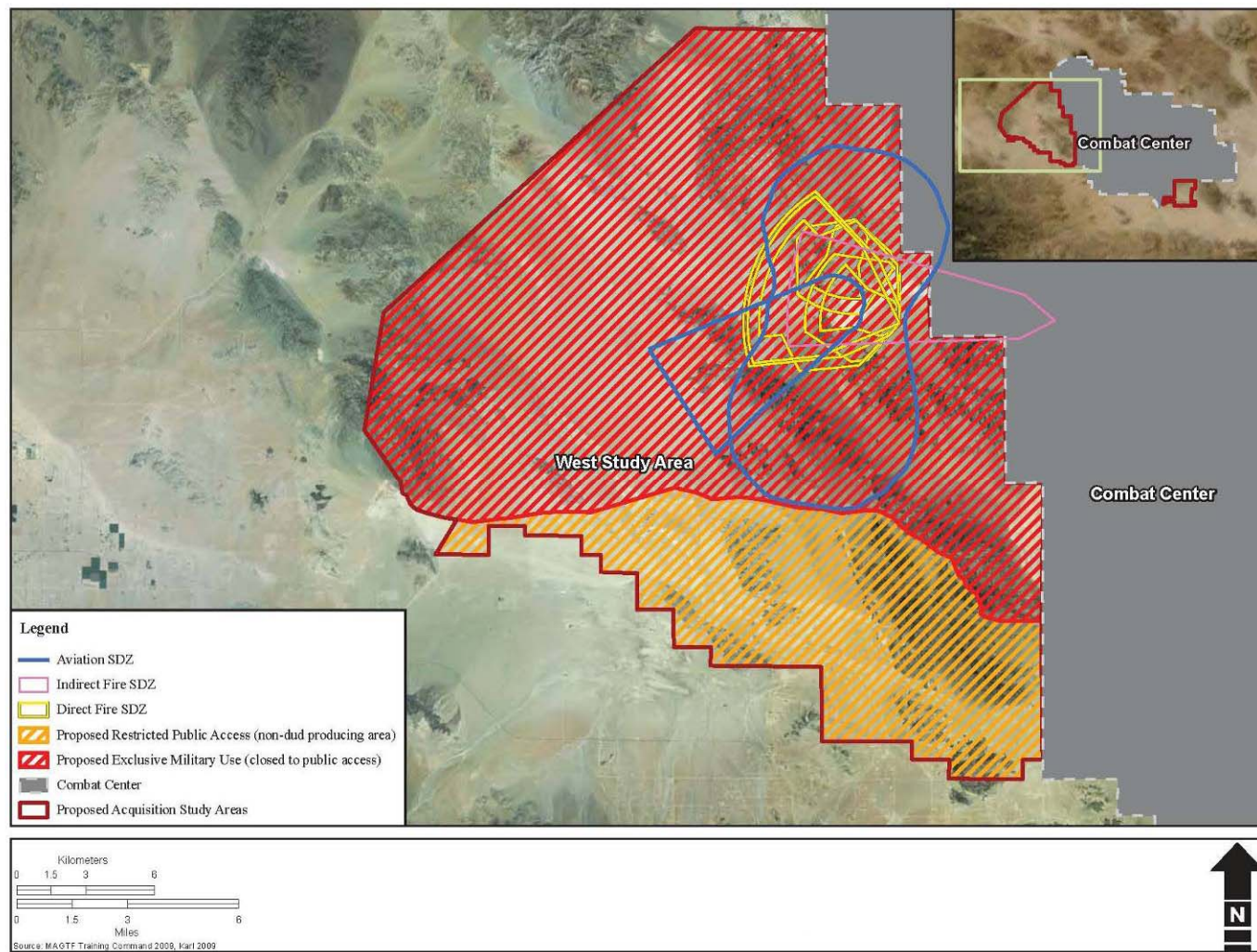


Figure 4. Footprint for MEB Building Block training exercises. (Source: Navy 2011a)

air support but the operational footprint for these MEB Building Block training activities would be much smaller than the full MEB Exercise (Figure 4).

- Each MEB Building Block training exercise would involve approximately 2,000 Marines, 276 wheeled and tracked vehicles, and 56 aircraft sorties.
- Support and staging areas would be set in the training areas, typically along battalion task force routes, and would contain ammunition, supplies, fuel, maintenance, mess, and other logistical support as well as medical evacuation units, special engineer units, and other “on-call” support for training exercises. These areas would potentially change from exercise to exercise depending on training requirements resulting in new areas of disturbance; however, many of the support and staging areas would be re-used.
- Maintenance personnel would use public roads to access certain training areas in the WSA for target resets and route maintenance, including explosive ordnance disposal (EOD), for the duration of MEB Exercise training. This would require, on average, two maintenance vehicles and occasionally a tractor trailer, at a maximum of 10 days per MEB exercise, for a total of 20 days per year.

The BA (Navy 2011a) identified that Agassiz’s desert tortoise (*Gopherus agassizii*), a federally and state- listed threatened species, is likely to be adversely affected by the proposed land acquisition and airspace establishment action. Several conservation actions were recommended in the BA, among them a plan to translocate tortoises from high & medium impact areas in the WSA and SSA prior to training exercises. These impact areas were evaluated in the BA for MEB Work-up, Final and Building Block exercises and are displayed in Figure 3. High-intensity battle activity (i.e., that likely to result in high-intensity disturbance) would occur in the more level, gently sloping terrain of the project area. While steeper and rockier areas likely would be subject to less disturbance (typically medium- or low-intensity disturbance), certain vehicles and equipment would be used to fight from covered terrain, such as rocks and reverse slopes of hills that provide cover. Wheeled re-supply and other vehicles would regularly use the Main Supply Routes (MSRs) in the project area during training.

The BA (Navy 2011a) estimated that extensive soil loss and/ or compaction would occur over the 12,209 hectares (30,169 acres) that would experience high-intensity disturbance from MEB exercises and MEB Building Block training, and some soil loss would also occur over the 41,029 ha (101,383 ac) that would experience medium-intensity disturbance from this training. Vegetation necessary for desert tortoise habitat would be expected to be severely degraded or lost in high intensity use areas; and degraded, if not lost, in medium-intensity use areas. The proposed action is anticipated to result in major degradation (i.e., complete or nearly complete loss of vegetation and disruption of substrates) of an estimated 4,273 ha (10,559 ac) of occupied desert tortoise habitat in the high-intensity disturbance zone of the study areas. MEB training and MEB Building Block training would also result in a lesser degree of degradation of an estimated 39,067

ha (96,537 ac) of occupied desert tortoise habitat in the medium-intensity training disturbance zone of the project area. For the WSA, roughly half of the area that would be disturbed has already been disturbed by Off Highway Vehicle (OHV) use (Karl 2010b).

MEB training for 50 years is not compatible with the continued existence of desert tortoises in the high and medium intensity areas. If not translocated, an estimated 1105 adult tortoises and potentially 2100 juveniles would be lost from these zones of the WSA and SSA due to the intensity of training exercises (Navy 2011a). Such a loss of tortoises and tortoise habitat is not compatible with recovery of this threatened species (Navy 2011a). Not only do these numbers represent 34% and 23%, respectively, of the adult and juvenile tortoises currently living in the local population, but a loss of this magnitude would be highly likely to have a negative impact on species recovery. Tortoise populations have declined severely throughout their geographic range in the past two decades (Karl 2004 and 2010c, McLuckie et al. 2006, Boarman et al. 2008, USFWS 2011a). A 20+-year range-wide drought, disease, long-term habitat degradation, predation, stochastic processes, population fragmentation, and habitat loss are factors that, working alone or together, are consistently cited as having contributed to observed tortoise declines. In the project area, tortoise declines have been documented on the Emerson Lake and Sand Hill training ranges adjacent to the WSA. The Sand Hill permanent study plot (Plot #2) plot declined from 37.8 to 10.4 tortoises/km² (98 to 27 tortoises/mi²) between 1991 and 2008 (Kiva 2008). Numbers of live tortoises at the Emerson Lake Plot declined from consistent levels of 15 to 20 tortoises/km² on three surveys between 1997 and 2003 to 3.0 tortoises/km² in 2009 (Kiva 2009). The 2003 estimate, for instance, was 16.3 ± 3.0 , significantly higher than the 2009 estimate of 3.0 ± 0.0 . So, given the widespread and local consistent and extreme declines in tortoise densities, further losses of over 1000 breeding age tortoises and 2000 smaller tortoises would further compromise species recovery.

In addition, the intensive degradation of over 43,000 ha (100,000 ac) would eliminate that habitat and/or leave it in sufficiently poor quality to render it largely unusable to tortoises. Any surviving tortoises from those areas would need to re-locate to areas with intact habitat that could support them. Since the areas slated for maneuvers in the WSA are in multiple places, tortoises dispersing from the MEB disturbance zones could move into equally dangerous areas. Actively translocating these tortoises to designated locations with suitable habitat, which is also safe from further anthropogenic degradation, would optimize dispersal.

Translocation, then, is necessary to support the continued existence of this population by maintaining tortoise abundance and genetic integrity. During this process, long-term monitoring of the translocation efforts for this large cohort of tortoises will provide valuable information on translocation efficacy as a tool for species recovery. Studies that can be conducted ancillary to, but as a result of the translocation, will provide important information for recovery methods. Such monitoring and studies are consistent with strategies outlined in the revised desert tortoise Recovery Plan (USFWS 2011a). In particular, the translocation of tortoises to areas with depressed or depleted populations, in an experimental context, is consistent with Recovery Plan Strategic Element 3.

Monitoring survival, disease, habitat and threats in the study cohorts, particularly the control group, is consistent with Strategic Element 4. Conducting research on translocation effectiveness, repatriation, stocking densities, habitat and disease are consistent with Strategic Element 5.

1.2 PURPOSE OF THE PLAN

The translocation plan presented herein is the first in a set of two translocation plans for the project. This is the initial, General Translocation Plan, which will be followed by a Final Translocation Plan in 2014. The purpose of this General Translocation Plan is to provide a framework for translocating tortoises from the training areas in the WSA and SSA, and an approach for further investigation of those factors that are important for implementing translocation and are likely to influence translocation success and tortoise recovery. As much as is currently possible, the plan identifies anticipated details of translocation, based on (1) information in the BA (Navy 2011a) and Environmental Impact Statement (Navy 2011b) about project activities, and (2) available information on the conditions in those areas involved in the translocation program (recipient and control areas). Also included is an approach for collecting further data in the next three years that will provide more detailed information than is currently available. The Final Translocation Plan for the project will incorporate these additional data and analyses, as well as collaboration with the resource agencies, and represent a final refinement of the translocation program.

This plan incorporates comments and direction from informal discussions with USFWS on 28 November 2011 and earlier, as well as changes reflected in the most recent USFWS translocation guidance (“Guidance”; USFWS 2011b). Except where superseded by informal discussion with USFWS, this Plan relies on formal guidelines from the 2011 guidance document and the 2009 guidelines (USFWS 2009b). Relevant newer guidance will be incorporated into the Final Translocation Plan as it becomes available from USFWS.

1.3 STRUCTURE OF THE PLAN

This plan first describes (a) the impact areas from which tortoises will be translocated, (b) the proposed and alternative recipient areas that will receive the translocated tortoises, and (c) the control areas that will be used as temporal and spatial controls for scientifically rigorous comparisons during translocation monitoring and research. Following this, effectiveness monitoring and proposed research is discussed. Finally, the details associated with the process of translocation will be described. These will include general procedures applicable to all tortoise translocations, such as data collected on all tortoises, tortoise transportation, authorized handlers, and reporting. Specific translocation procedures then will be discussed.

The reader is advised that this Plan is for desert tortoise clearance and translocation only. Other conservation measures are included in the BA (Navy 2011a).

2.0 MAJOR CONSIDERATIONS FOR TRANSLOCATING DESERT TORTOISES FROM THE LAND ACQUISITION AREA

This section discusses the major considerations relative to the areas where tortoises will be affected: (a) impact areas; (b) the recipient areas; and (c) control areas. Descriptions and analyses of each area, relevant to desert tortoises and the implications of translocation, are discussed. Baseline (pre-translocation) studies that will refine our current knowledge of these areas are described. Programs for both translocation effectiveness monitoring and specific research topics are summarized.

2.1 IMPACT AREAS

This section describes tortoise abundance in the areas that will be impacted in the WSA and SSA and the number of those tortoises that are projected to require translocation. Features of the impact areas that affect current tortoise densities – habitat, disease incidence, protected areas, impacts and threats – are described based on available information.

2.1.1 Tortoise Density and the Number of Tortoises to be Translocated

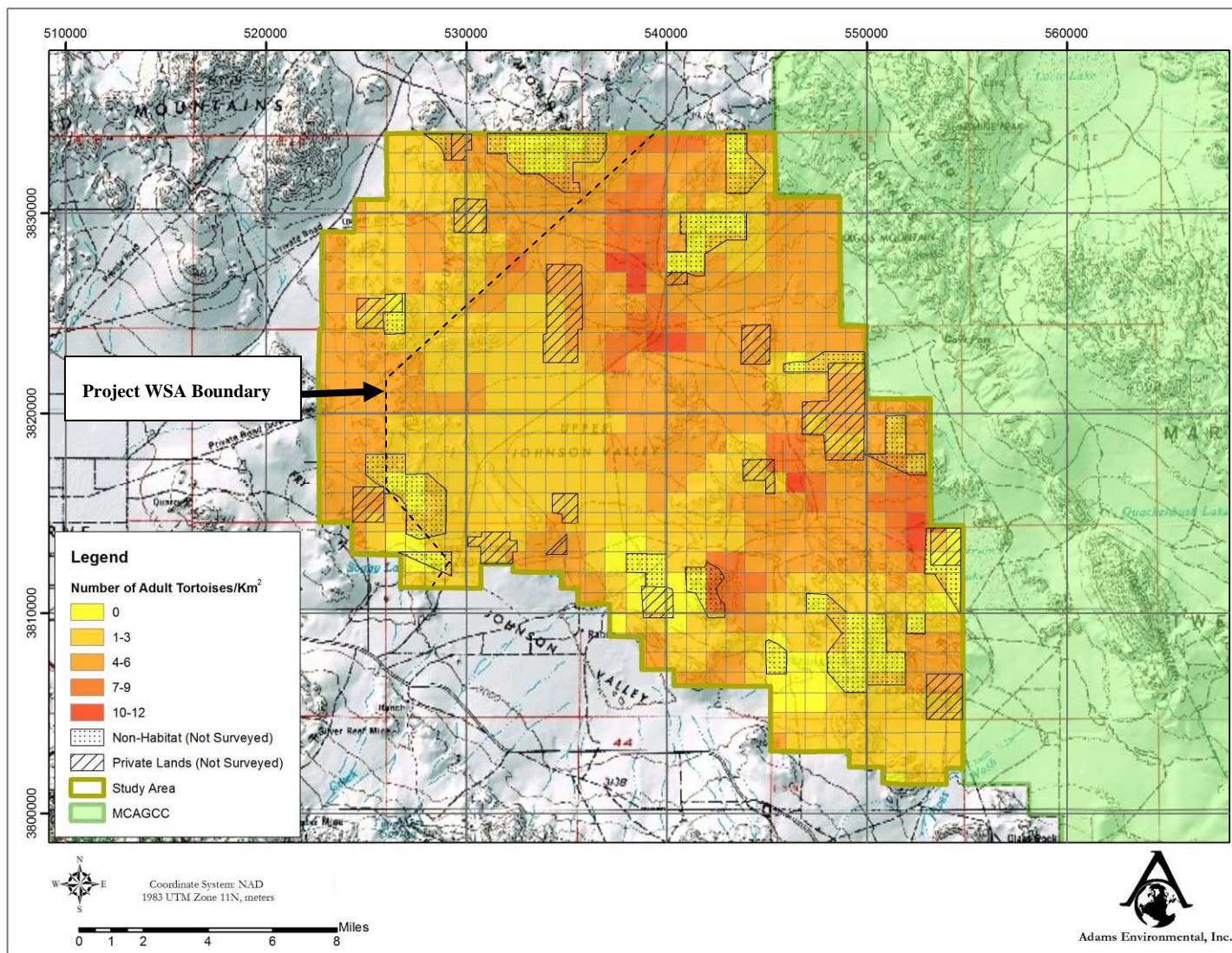
In the most recent survey (2009), tortoise density estimates in the WSA and SSA ranged from 0 to 13.6 adult tortoises per km², although densities over most of the study area were <9 tortoises per km² (Figures 5 and 6; Karl 2010a). Less than 3% of the WSA and SSA had more than 9 tortoises per km². The portion of the WSA associated with the proposed project contained between 1,563 and 2,528 tortoises using the Tortoise Regional Estimate of Density (TRED) model (Karl 2002) and between 1,442 and 5,670 tortoises using the USFWS protocol (Table 1).

Table 1. Abundance of Desert Tortoises in the West and South Study Areas in 2009.
(Source: Navy 2011a)

Study Area	km ² in Study Area	km ² Sampled	Linear km Walked	Total Number of Adult Tortoises (Point Estimate and 95% Confidence Intervals)					
				TRED Model Survey			USFWS Protocol Survey		
				Point Estimate	Lower CI	Upper CI	Point Estimate	Lower CI	Upper CI
West	593.5	171	1641	2045.5	1562.6	2528.4	2,859.6	1,442.2	5,669.9
South	86.21	25	240	369.3	305.3	433.4	355.5	134.4	940.6

Notes: Estimates from use of a TRED Model survey (Karl 2002) and USFWS (2009a) protocol survey are depicted.

Source: Karl (2010a).



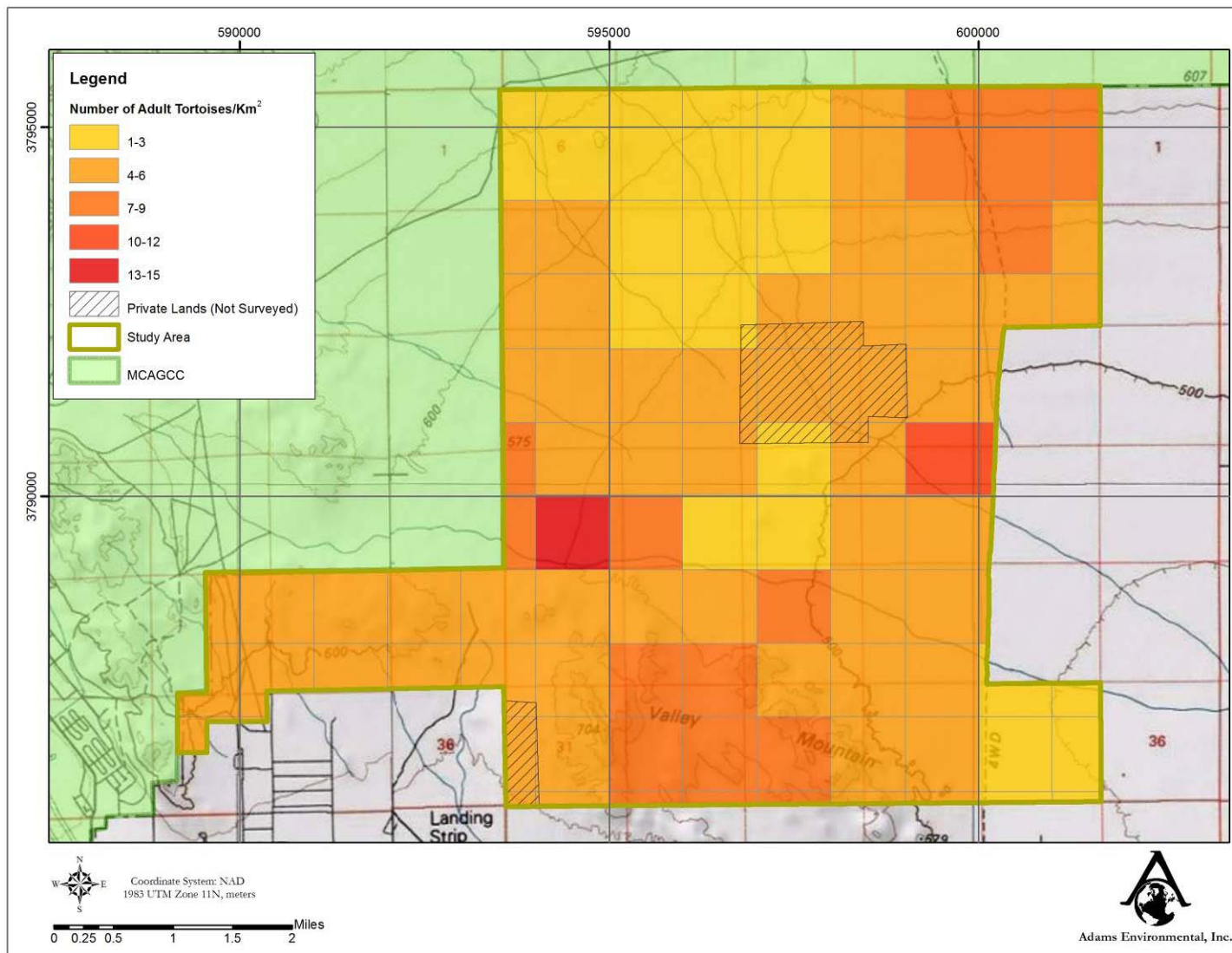


Figure 6. Density of adult tortoises in the SSA in 2009. (Source: Karl 2010a)

Based on the assumptions and methodology described in Appendix C of the BA (Navy 2011a) and using the approved USFWS pre-project protocol method (USFWS 2009a), an estimated 1,105 (95% C.I. 544 – 2,262) adult tortoises¹ in the study areas may be translocated, injured, or killed over the estimated 50-year life of the proposed action (Table 2). Potentially 2100 juvenile may be translocated (Navy 2011a).

Because the features describing high and medium impacts are two to ten kilometers wide, and fencing that would keep tortoises from re-entering the impact areas is not currently proposed, it is anticipated that no tortoise will be moved ≤ 500 m from its capture point. All tortoises will be moved to well-defined recipient sites that are substantially further from their capture location. It is currently anticipated that none will be moved >40 km, in accordance with USFWS *Guidance* (USFWS 2011b); however, during development of the Final Translocation Plan and further discussions with USFWS, it is possible that some recipient sites will be >40 km from certain individual tortoises.

Table 2. Estimated Number (95% CI) of Adult Tortoises within High- and Medium- Disturbance Zones Under the Proposed Action (Source: Navy 2011a)

<i>Study Area</i>	<i>Number of Adult Tortoises in High Disturbance Zone</i>		<i>Number of Adult Tortoises in Medium Disturbance Zone</i>	
	<i>TRED Model Survey</i>	<i>USFWS Protocol (2009a)</i>	<i>TRED Model Survey</i>	<i>USFWS Protocol (2009a)</i>
West Study Area	173 (132 – 214)	276 (139 - 547)	433 (325 – 543)	724 (365 – 1436)
South Study Area	14 (10 – 18)	26 (10 - 70)	48 (36 - 59)	79 (30 - 209)
<i>Subtotal for Study Areas</i>	<i>187</i> <i>(142 – 232)</i>	<i>302</i> <i>(149 - 617)</i>	<i>481</i> <i>(361 - 602)</i>	<i>803</i> <i>(395 – 1,645)</i>
Combat Center	312 (23 – 602)	312 (23 – 602)	1,226 (119 – 2,333)	1,226 (119 – 2,333)
Total	499 (165 – 834)	614 (172 – 1,219)	1,707 (480 – 2,935)	2,029 (514 – 3,978)

Note: Values calculated based on desert tortoise density estimates, using GIS overlay of proposed routes of travel, areas of expected ordnance impact, and other factors. Subtotals may not match the components due to rounding. Estimated tortoise abundance in the impacted portions of the study areas uses data from the TRED model survey (Karl 2010a) and the USFWS model survey (USFWS 2009a). Estimated tortoise abundance in impacted portions of the Combat Center uses data from model surveys that employ Total Corrected Sign. Refer to Appendix C for methodology and definitions of disturbance zones.

Source: Data from Kiva 2001, Karl 2010a.

¹ Note that the USFWS (2009a) protocol labels adults as those tortoises ≥ 160 mm carapace length. TRED and all other discussions in this document refer to adults as those tortoises ≥ 180 mm.

2.1.2 Incidence of Disease

Health sampling has not been conducted in the WSA and SSA. However, sampling on the Combat Center was conducted in 2008 (Kiva 2008), 2010 and 2011 (J. Smith, unpub. draft data, 2011) on training ranges bordering the WSA and SSA. In the WSA, 9 samples were taken in 2008 on Sand Hill, 124 samples were taken in 2010 on the Sand Hill and Acorn ranges, and 13 were collected in 2011 on the Emerson Lake and Maumee Mine ranges. In 2008, Kiva (2008) reported that eight of the nine tortoises were seronegative for *Mycoplasma agassizii*, *M. testudinum*, and herpesvirus; one tortoise was suspect. None had clinical signs for respiratory disease. In 2010, 115 tortoises were seronegative for *M. agassizii*, five were positive, and four were suspect. For *M. testudinum*, 109 were seronegative, seven were positive, and eight were suspect. Six had abnormal nasal discharges and 59 had evidence of shell disease. In 2011, all 13 tortoises were seronegative for both *Mycoplasma* species and none had nasal discharges.

The USFWS 2011 *Guidance* identifies disease prevalence as “the cumulative proportion of tortoises within the population of interest that are seropositive to *Mycoplasma agassizii* antibodies, those that are seropositive to *Mycoplasma testudineum* antibodies, and those that have other clinical signs that disqualify an individual from being translocated” (USFWS 2011c). For 2008 and 2011, disease incidence is zero in the sampled groups. Because the available 2010 data are in draft form and results for specific tortoises are not yet available, a cumulative accounting of diseased individuals is not possible (i.e., some tortoises that are seropositive for *M. agassizii* may also be seropositive for *M. testudinum* and/or have clinical signs). However, a conservative estimate of disease prevalence along the eastern WSA, based on the total combined number of seropositive results for both *Mycoplasma* species plus counts of clinical signs (=18), is 14.5% of the sampled population. So, disease incidence along the eastern WSA falls somewhere between zero and 14.5%.

Adjacent to the SSA, six tortoises were sampled in 2010 in Cleghorn Pass; four were seronegative and two were suspect. None had abnormal nasal discharges and four had abnormal shell presentations. Disease prevalence, then, was approximately 0%.

2.1.3 Habitat

The study areas lie in the Mojave Desert at elevations of approximately 780 to 1830 m (WSA) and 440 to 700 m (SSA). Topography ranges from several playas to rugged mountains in the WSA, while the SSA is primarily dominated by a broad, very gently sloping bajada, with low mountains and foothills in the south. Drainage patterns reflect the local topography. Along the broad bajadas, drainage is primarily characterized by scattered, well-defined washes and networks of numerous, narrow runnels. The former are several-yards-wide, sandy to cobbly drainages that carry periodic runoff to regional drainages. These washes are often incised, from a half to several yards deep, and vegetated along the banks by both shrubs and perennial grasses. In contrast, the numerous, shallow runnels are typically only a yard or less wide, one-to-few inches deep, and irregularly vegetated by locally common shrub species. They typically fail to either flow or provide

through-flow to larger drainages. Sheet flow (i.e., overland flow of water and debris) is evident on several bajadas. Substrates there tend to be more gravelly than non-sheeting habitats due to the hydrologic transport of materials. Throughout the study area, percolation into the plain or nearby playa occurs where slopes are negligible.

The presence of coarse particles in the substrate varies and is largely dependent on the proximity to mountains and attendant hydrologic forces. Hence, boulders and cobbles are common in the upper bajadas and toeslopes, with smaller particles downslope. Desert pavement is intermittently present depending on depositional action and erosion. The playas are largely devoid of coarse particles. Soils range from slightly hard silt in the playas to soft sand and coarse-sandy loams as one proceeds upslope; along mountain slopes, soils tend to be gravelly and hard. Downwind of the playas, sand has been deposited in small to many-acre loose-sandy fields.

Vegetation communities in the study areas are described by several subsets of Mojavean-Sonoran Desert Scrub, Madrean Warm Semi-Desert Wash Woodland Scrub, and Warm Semi-Desert/Mediterranean Alkali-Saline Wetland, all three broad Mojave Desert classifications of the National Vegetation Classification Hierarchy (Federal Geographic Data Committee 2008). The subsets, or alliances, of these broad vegetation groups, developed by Sawyer, Keeler-Wolf and Evens (2009) and used by the California Natural Diversity Data Base (California Department of Fish and Game [CDFG] 2010), include several scrub and wash-scrub communities. Scrub communities in the study areas are largely dominated by two shrub species: creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). However, common elements variously include white rhatany (*Krameria grayi*), chollas (*Cylindropuntia echinocarpa*, *C. ramosissima*), indigo bush (*Psoralea arborescens*), Mormon tea (*Ephedra nevadensis*), and encelia (*Encelia frutescens*, *E. farinosa*). Drainages often host a distinct suite of species, including cheesebush (*Ambrosia* [= *Hymenoclea*] *salsola*), galleta grass (*Pleuraphis rigida*), desert peach (*Prunus fasciculatum*), desert lavender (*Hyptis emoryi*), smoke tree (*Psoralea spinosa*) and cat's claw (*Senecio* [= *Acacia*] *greggii*). Understory species are dominated by one exotic grass, split grass (*Schismus arabicus*) and numerous dicot species. The shrub component on upper slopes is more diverse than downslope and often includes Mojave yucca (*Yucca schidigera*). Downslope, near playas, Chenopod scrubs dominate, especially allscale (*Atriplex polycarpa*), grading to inkweed (*Suaeda moquinii*) and iodine bush (*Allenrolfea occidentalis*) at the lake edges. Vegetation in the dunes and sand fields is dominated by creosote bush, galleta grass, and white bursage; Emory dalea (*Psoralea emoryi*) is occasional to common. Representative understory species include dune primrose (*Oenothera deltoides*), sand verbena (*Abronia villosa*), forget-me-not (*Cryptantha angustifolia*), Spanish needle (*Palafoxia arida*), and plantago (*Plantago ovata*). Acreage for the major plant communities was quantified in the BA and is presented in Table 3.

Table 3. Plant Communities and Land Classifications¹ on the Combat Center and Study Areas (Source: Navy 2011a)

<i>Plant Community or Land Classification</i>	<i>Area (Percent of Total for Specific Area)</i>	<i>Dominant Species</i>	<i>Subdominant Species (If Applicable)</i>
West Study Area			
<i>Shrub-Dominated Communities</i>			
Creosote bush scrub	138,205 acres (94%)	Creosote bush White bursage Brittlebush Cheesebush	Sweetbush Spiny senna Desert lavender
Black brush scrub	1,709 acres (1%)	Black brush (<i>Coleogyne ramosissima</i>) Shadscale (<i>Atriplex confertifolia</i>) Creosote bush California buckwheat (<i>Eriogonum fasciculatum</i>)	None
Mojave yucca	1,203 acres (0.8%)	Creosote bush White bursage	Mojave yucca Spiny senna Cheesebush Black brush
<i>Tree-Dominated Communities</i>			
Mesquite	297 acres (0.2%)	Honey mesquite	All-scale Bush seepweed Fourwing saltbush
Catclaw acacia	194 acres (0.1%)	Catclaw acacia Cheesebush Smoke tree	Creosote bush Cheesebush Sweetbush Desert willow
Smoketree woodland	126 acres (0.1%)	Smoke tree Desert willow	Sweetbush Catclaw acacia Creosote bush
<i>Other Land Classifications</i>			
Playa	1,544 acres (1%)	N/A	N/A
Subtotal	143,278 acres (98%)		
South Study Area			
<i>Shrub-Dominated Communities</i>			
Creosote bush scrub	19,320 acres (88%)	Creosote bush White bursage Brittlebush Cheesebush	Sweetbush Spiny senna Desert lavender
<i>Tree-Dominated Communities</i>			
Catclaw acacia	115 acres (0.5%)	Catclaw acacia Smoke tree Desert willow	Burrobush (<i>Ambrosia salsola</i>) Sweetbush Brittlebush
<i>Other Land Classifications</i>			
Desert dunes	2,364 acres (11%)	No dominant species	Desert twinbugs (<i>Dicoria canescens</i>)

Table 3. Plant Communities and Land Classifications¹ on the Combat Center and Study Areas (Source: Navy 2011a)

<i>Plant Community or Land Classification</i>	<i>Area (Percent of Total for Specific Area)</i>	<i>Dominant Species</i>	<i>Subdominant Species (If Applicable)</i>
			Desert sand verbena (<i>Abronia villosa</i>) Various buckwheat species (<i>Eriogonum</i> spp.) Indian ricegrass
Subtotal	21,799 acres		
Total for all Areas	801,058 acres		

Notes: ¹As defined by Keeler-Wolf et al (2009). Total acreages may not equal those listed for the acquisition areas in Section 1.2 of the BA due to rounding.

Source for Data in Table: USGS 2004 (part of WSA and SSA), California Department of Forestry 2003 (remainder of WSA), AgriChemical and Supply 2008 (Combat Center).

2.1.4 Anthropogenic Uses

WSA

The major current use of the WSA is as an OHV recreation area (U.S. Bureau of Land Management [BLM] 1992, 2005). The entire WSA falls within the BLM's designated Johnson Valley OHV Area (BLM 1998, 2007). OHVs have unrestricted use throughout this recreation area and, as a result, tracks and trails are present throughout the WSA. The greatest concentrations of OHV use are in the central and southern WSA, consistent with camping areas that are accessible to motor homes and trailers. However, evidence of an OHV race (markers, contestants, crushed tortoises) is present near the northeastern boundary of the WSA. An estimated 84,721 acres (343 km²) in the WSA and SSA, combined, were considered to have high levels of disturbance from past OHV-related activities; an additional 39,273 acres (159 km²) have experienced moderate levels of disturbance (Karl 2010b).

Historic use of the WSA includes mining and grazing. There are several small mines scattered throughout the area, as well as the larger Bessemer Mine, which has a landing strip and a major, graded dirt road extending south to Highway 62. Based on the lack of obvious recent activity, it appears that most of the mines in the area have been abandoned. Approximately half of the WSA is overlapped by the Johnson Valley sheep grazing allotment (BLM 2005). The allotment was only used one year between 1991 and 2004 and an application for grazing was approved by BLM in 2006 (BLM 2006). However, this allotment is subject to the "9-Mile Rule", whereby sheep are prohibited within nine miles of occupied bighorn sheep habitat, so current and future grazing is highly restricted (Navy 2011b). The northern portion of the WSA overlaps the Ord Mountain grazing allotment. This allotment has a long history of cattle grazing. Per stipulations in the West Mojave Plan (WMP; BLM 2005), cattle grazing was to be excluded during spring and fall throughout this overlap area in years when biomass

production of ephemeral vegetation is below 230 lb/acre (BLM 2006). No cows were seen in 2008 and 2009 surveys in this exclusion area, but we observed old cattle manure (of unknown age).

Other anthropogenic features in the WSA include small dirt roads throughout the area and a high-voltage transmission line corridor that traverses the northwestern border of the WSA. South of the WSA, there are several small housing communities populated by small, and often abandoned, single-family dwellings.

SSA

There is little human use of the SSA. It is not within a grazing allotment (BLM 2005) and no mines were observed. Road access through the SSA is absent and there is only minor use of the southern border area for OHV recreation. South of the SSA, and in the southwestern corner, are scattered, single-family dwellings.

2.1.5 Threats to Desert Tortoises

In addition to anthropogenic impacts described above in Section 2.1.5, ravens, coyotes and domestic dogs are existing threats in the study areas. Recent high mortality rates observed in 2009 at the Emerson Lake plot adjacent to the WSA and at two one-square-kilometer plots (Plot 1 and 6; Karl 2010) in the WSA implicated predation by canids in many of the deaths (Kiva 2009). Nine tortoises had died within the previous four years at Emerson Lake, seven at Plot 1 and eight at Plot 6. Even assuming that some of these carcasses were probably juvenile tortoises, they still represent fairly high mortalities compared to densities of live tortoises - Emerson Lake: 3.0 ± 0 # tortoises/km²; Plot 1: 7.8 ± 1.3 ; and Plot 6: 0.0. The primary investigator stated that the causes of death for the Emerson Lake plot and Plot 1 appeared to be primarily due to canids; causes of death on Plot 6 were unknown (Kiva 2009).

On the Sand Hill plot in 2008, nine out of the ten adult tortoises had shell trauma that was attributed to dogs (Kiva 2008). In earlier studies on the Sand Hill and Emerson Lake plots, the principal investigator stated that both plots had tortoises that were severely mauled by free-roaming dogs (Kiva 2001). All 11 live tortoises observed in a 2009 study paralleling the base border of the Sand Hill and West Training Areas had evidence of canid trauma (BT Henen, unpublished data).

The proposed project's expanded training activities may alter the predator community in the study areas (Navy 2011a). Cessation of public OHV use in the exclusive military use area of the WSA would remove most if not all existing predator subsidies (e.g., food and water from OHV users, hikers, and campers) in that area. However, ravens and coyotes may be attracted to heightened scavenging opportunities and water availability associated with military training, especially in parts of the WSA that are not currently heavily used for OHV recreation, and similarly in the little-used SSA. Elevated desert tortoise predation could occur when training personnel complete exercises. Existing trash control and military training cleanup measures should partially ameliorate these effects. Surface

disturbance and reduced plant cover associated with military training activities may also facilitate detection of hatchling and juvenile desert tortoises by predators such as ravens and coyotes.

The construction of communications towers in the WSA and northwest of the WSA, as well as the fenced Company Objectives², would provide perching opportunities for ravens and raptors, possibly increasing predation on desert tortoise hatchlings and juveniles. However, standard conservation measures to install deterrents (e.g., spikes) on the towers, as described in the current Integrated Natural Resources Management Plan (INRMP), would ameliorate this potential adverse effect.

2.2 RECIPIENT AREAS

This section describes the proposed recipient areas and alternative areas based on available information. Studies of these areas over the next three years that will provide more information and assist both in refining these areas and determining specific translocation procedures in each are summarized. Similar to the section on the impact areas, this section describes the status of desert tortoises in the proposed recipient areas and the features that make these areas suitable translocation areas.

2.2.1 Number, Location and Size of Recipient Areas

Proposed Recipient Areas

Proposed recipient areas are locations that have been targeted for investigation as suitable tortoise release areas. These areas are larger than the actual release sites (“recipient sites”), which will be determined during baseline studies over the next three years (see Section 2.2.2, below). It is anticipated some parts of these proposed areas may not be suitable for translocation. Conversely, during the upcoming studies, other areas may be determined to be better recipient areas.

For the WSA, six areas are proposed as recipient areas: two proposed Special Use Areas (SUAs) in the WSA; three areas immediately adjacent to the northern border of the WSA (“Ord-Rodman”), one of which abuts an SUA³; and two areas on the Sunshine Peak Training Area (Figure 7). Each area is currently about 22-39 km² (8.5 to 15 mi²; Table 4)

² Two areas within the Restricted Public Access Area (RPAA), each measuring 984 by 984 feet (300 by 300 meters), would be permanently designated as “Company Objective” areas that would remain closed to public access/use year-round and would contain trench lines, obstacles, and bunkers.

³ SUAs are designated areas within which bivouacs, off-road vehicle use, or training involving vehicle activity, are either restricted (Category 1) or discouraged (Category 2). The new SUAs on the study areas would be designated as Category 1 (no mechanized maneuver), with the exception of a portion of the northern SUA in the WSA, that would be designated as Category 2 from the existing road to the study area boundary.

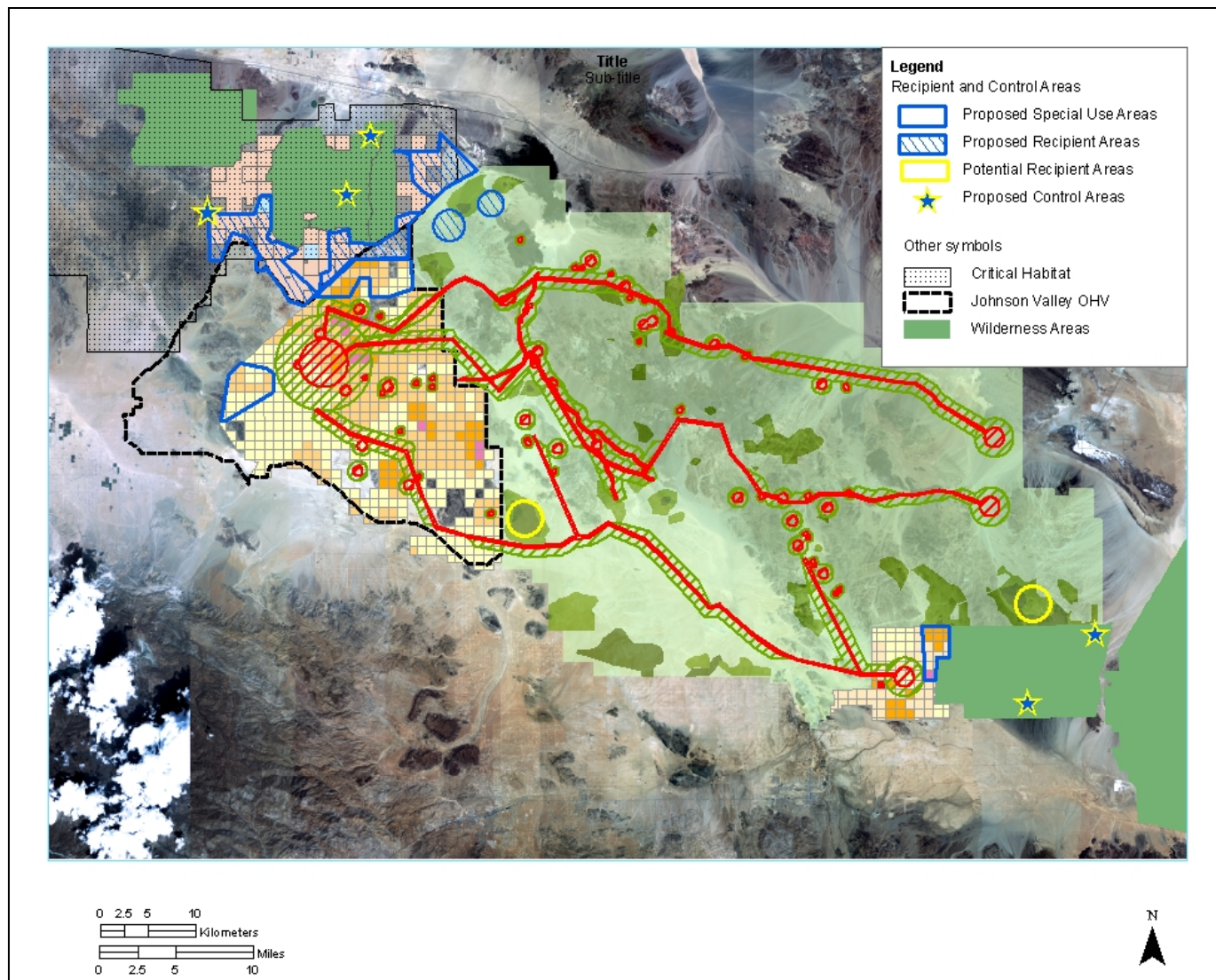


Figure 7. Proposed and alternate recipient areas and proposed control areas for translocation monitoring and research, in the context of MEB-level training (see Figure 3 for explanation) and conservation areas.

in size and together total approximately 153 km² (59 mi² or 37,855 acres), but these are only approximate sizes and boundaries may change following upcoming studies.

In the SSA, the entire, 2935-acre (11.9 km²) proposed SUA is proposed as a recipient area (Figure 7).

Table 4. Sizes of proposed and alternative recipient areas

	<i>Study Area</i>	<i>Recipient Area</i>	<i>Size (acres)</i>	
			<i>acres</i>	<i>km²</i>
Proposed Recipient Areas	WSA	SUAs (combined)	12015	48.6
		Ord-Rodman-combined	19,199	77.7
		Sunshine Peak (combined)	3706.5	15.0
	SSA	SUA	2935	11.9
	Total		37855.5	153.2
Potential Alternate Recipient Areas	WSA	Emerson Lake SUA	2471	10.0
	SSA	Bullion SUA	2471	10.0
	Total		4942	20

Potential Alternative Recipient Areas

In the event that some of the proposed recipient area is found to be unsuitable, two alternative areas are under consideration, one in the Emerson Lake Training Area and the other in the Bullion Training Area (Figure 7). Both locations are in Category 2 SUAs in these training ranges, wherein off-MSR is discouraged, but not restricted, because of biological and/or cultural sensitivities.

2.2.2 Baseline Studies on the Proposed and Alternative Recipient Areas

In the next three years, several surveys will be conducted to provide more detailed information that can be applied to the project translocation. The results of these studies will direct and refine translocation, the final details of which will be in the Final Translocation Plan. These studies are consistent with the USFWS *Guidance* (USFWS 2011b) and include:

- Desert tortoise density and distribution studies on the impact, recipient, and control areas
- Health status of the impact, recipient, and control areas
- Habitat analysis of the recipient and control sites
- Risk analysis in the recipient and control sites

Desert tortoise density throughout the proposed recipient and control areas and in the impact area will be assessed via the TRED (Karl 2002, 2010a) and USFWS protocol (USFWS 2009a) methods that have been used in the project area to determine tortoise density and distribution. Recipient and control areas will be assessed first because (1) there are no current, focused data for most of the areas outside the WSA and SSA and (2) early surveys will help refine the release and control sites in time to choose and survey alternative sites, if necessary. In the final year prior to translocation (2013-2014), tortoise density will be re-evaluated in the impact area, using these same techniques, to provide current densities.

In addition to the more widespread density estimates, focused, mark-recapture surveys will be conducted on 10-12, one square kilometer plots in the recipient and control areas. Four would be in the control sites and eight would be in the Ord-Rodman, Sunshine Peak, and SUA recipient areas. These plots would provide precise density estimates on several sites within these research areas, as well as population size structure, and would provide the pre-translocation temporal control for the translocation effectiveness monitoring program (see Section 2.4, below).

During the density surveys, the health status of desert tortoises in all three areas will be assessed via blood samples and visual observation of clinical signs. Approval to handle tortoises for this purpose will be through an existing NREA recovery permit modification (TE-17730). Methods and equipment for conducting health sampling will be consistent with the current guidelines from the USFWS (2011c). Minimum sample sizes will be determined by the number needed to detect 10-percent disease prevalence at the 95-percent confidence level (USFWS 2011b). Since it is anticipated that approximately 200 tortoises will be needed for effectiveness monitoring in each of the recipient and control sites, the USFWS *Guidance* identifies that a minimum of approximately 25 to 40 individuals must be sampled.

The results of both the density and health surveys will be valid, for purposes of refining the final translocation program, through the development of the Final Translocation Plan. During clearance surveys (see Section 3.2.2, below), density and health will be re-assessed to provide current information.

Habitat will be assessed on the proposed recipient and control areas. At a minimum, habitat will be assessed qualitatively relative to plant species composition, species density and dominance, shrub cover percent, shrub height, common and dominant understory

species, tortoise forage species, soils, substrates, hydrology, and topography. The habitat model currently being developed for desert tortoises by NREA will be implemented on the proposed recipient and control areas to rank sites within each area and refine the final locations for the recipient and control sites. This ranking, plus the tortoise density observed at each site, will assist in determining the stocking (i.e., release) densities at each site.

Current and future anthropogenic disturbances and potential threats in the proposed recipient and control areas (e.g., dogs or elevated coyote or raven populations associated with human development, proximity to major highways, existing and future utility infrastructure, solar and other development) will be evaluated. This will be completed through a combination of literature searches and field surveys. Literature searches will include a review of plans and amendments (e.g., USFWS Recovery Plan supplemental chapter on renewable energy; WMP), projects, documents relating to permits and land uses, and broad-based programs (e.g., Desert Renewable Energy Conservation Plan [DRECP]). Field surveys will include a qualitative and quantitative survey of predator populations (e.g., avian counts, tracking stations) and disturbance types and levels. These surveys will be conducted simultaneously or in association with the desert tortoise density and distribution surveys.

2.2.3 Tortoise Abundance

Proposed Recipient Areas

Tortoise abundance in the proposed SUAs and in the parts of the southern and western proposed Ord-Rodman recipient areas that were originally surveyed for the WSA is known from TRED density surveys in 2009 (Figures 5 and 6; Karl 2010). Point densities ranged from 0 to 12.9 adult tortoises/km² (0-33.4 adult tortoises/mi²) in the northernmost SUA in the WSA and adjacent Ord-Rodman area and <1 to 6.0 adult tortoises/km² (<2.6-15.5 adult tortoises/mi²) in the westernmost SUA. Estimated total abundance of adult tortoises was 131 and 89 in the two SUAs, respectively (Table 5). An estimated 655 and 382 adults were estimated for each SUA, respectively.

In the SSA SUA, tortoise densities ranged from 3.9 to 8.6 adult tortoises/km² (10.1-22.2 adult tortoises/mi²) (Figure 6; Karl 2010a), for a total estimated abundance of 82 adults; 387 juvenile tortoises were estimated (Navy 2011a).

In the Sunshine Peak Training Area, the most recent data are from 1997, when tortoise densities in the proposed recipient area ranged from 2.3 to 7.7 tortoises/km² (6-20 tortoises/mi²) (Jones and Stokes and Kiva 1998). There were higher density areas observed near the proposed recipient areas, but adding more tortoises to a higher density area (should it still be higher) is complicated by carrying capacity considerations. During the next three years' studies, questions about current densities, release sites and habitat capacity to support tortoises in Sunshine Peak will be addressed.

Table 5. Estimated Number (95% CI) of Tortoises within New Special Use Areas That Would Be Established in the WSA and SSA (Source: Navy 2011a.)

<i>Special Use Area</i>	<i>Adult Tortoises in the New SUAs</i>		<i>Juvenile Tortoises in the New SUAs</i>	
	<i>TRED</i>	<i>USFWS</i>	<i>TRED</i>	<i>USFWS</i>
West Study Area, Northern SUA	139 (111 – 168)	-*	655 (523 – 792)	-
West Study Area, Western SUA	81 (58 – 104)	-	382 (273 – 490)	-
South Study Area SUA	82 (68 – 95)	-	387 (321 – 448)	-
Total	303 (238 – 367)	372 (169 – 823)	1,424 (1,117 – 1,730)	1,756 (794 – 3,881)

Notes: Values calculated based on desert tortoise density estimates, using GIS overlay of proposed Special Use Areas (Figure 3-2). *When using the USFWS protocol survey (USFWS 2009a), the Special Use Areas were considered together in order to robustly estimate abundance and 95% CI. Use of the TRED model survey allowed for individual estimates of density and abundance for individual Special Use Areas.

Source: Adult data from Karl 2010a

North of the areas surveyed in the original WSA, the only current information on tortoise density is from the USFWS' rangewide sampling program. Adult tortoise densities in the Ord-Rodman monitoring stratum were estimated in 2010 as 7.5 /km² (19.4 tortoises/mi²) (Table 6; USFWS 2010). Historically, there are a few abundance data from other regional sampling programs. Beginning in 1977, 10-meter-wide, 2.4-km-long belt transects were used to sample broad regions within the desert tortoise's range, including in and around the WSA and SSA, to estimate tortoise abundance. Early transects were spaced at two per township (one township = 36 mi²; Berry and Nicholson 1984); later transects conducted for the WMP (BLM 2005) were spaced at one or two per 2.59 km² (1 mi²). All size classes of tortoises were considered together. While these transects were poor estimators of tortoise density (Karl 2001), they were useful in suggesting variation in tortoise abundance, especially at the extremes. Transects from the late 1970s estimated tortoise densities in the proposed Ord-Rodman recipient area at approximately 8 to 13 tortoises/km² (20-50 tortoises/mi²) (Berry and Nicholson 1984b). BLM's WMP transects sampled the WSA and areas to the north between 1998 and 2002 and found moderate to fairly high sign counts in the currently proposed eastern and southern Ord-Rodman recipient areas. Several transects had 9-16 or 17-28 Total Corrected Sign (TCS) (9-16 was the middle range of sign categories) (BLM 2005).

Potential Alternative Recipient Areas

A mark-recapture, trend plot lies in each of the Emerson Lake and Bullion potential alternative recipient areas. The Emerson Lake plot was surveyed in 1991, 1997, 2003 and 2009. Numbers of live tortoises declined from 15 to 20 tortoises/km² during the three surveys between 1997 and 2003 (e.g., 16.3 ± 3.0 tortoises/km² in 2003) to 3.0 tortoises/km² in 2009, a significant difference (Kiva 2009).

Table 6. Comparison of 2009 tortoise densities (# adult tortoises/km²) with those from the USFWS 2010 range-wide sampling program.

Study Area	Tortoise Density (# adult tortoises/km ²) ¹		Tortoise (# adult tortoises/km ²) in Corresponding USFWS Sampling Strata ² USFWS (2010) Sampling Program
	TRED Model Survey	USFWS Protocol (2009a)	
WSA	3.7	7.1	Western Mojave Recovery Unit – 3.1 Ord-Rodman monitoring stratum ³ – 7.5
SSA	4.9	5.7	Western Mojave Recovery Unit – 3.1 Pinto Mountain stratum – 3.4 Joshua Tree National Park – 2.8

¹ Source: Karl 2010a, except revision for WSA (Navy 2011a) due to decrease in size of study area from 2009

² USFWS 2010.

³ Monitoring strata are “Tortoise Conservation Areas” and essentially overlap both the critical habitat unit and DWMA.

The Bullion plot was surveyed three times between 2001, 2003, and 2008 (Kiva 2008). Overall densities were 31.0 ± 13.3 , 42.4 ± 14.4 and 13.4 ± 4.7 tortoises/km², respectively. The total numbers of tortoises were somewhat similar in each survey (28 in 2001, 30 in 2003 and 21 in 2008), but the apparent “declines” were due to a decrease in the number of adult tortoises. This size group declined 22.7% from 2001 (22 adults) to 2003 (17 adults) and 35.3% from 2003 to 2008 (11 adults). While the number of adult tortoises declined 50% from 2001 and 2008, the principal investigator stated that the most likely reason for the drop in adult tortoise numbers and estimate/variance was the timing of the 2008 survey. Due to permitting delays, the survey did not occur until late May, whereas both the 2001 and 2003 surveys were carried out in mid/late April, a time period when desert tortoises are predictably more active and more likely to be encountered. Food availability was similar for all three surveys and human impacts appeared to have decreased during the previous eight years; only two adult carcasses were found. Small tortoises, under 140 mm in length, comprised 33.3% of the 21 observed tortoises in 2008, indicating that reproduction and recruitment was occurring.

2.2.4 Incidence of Disease

Proposed Recipient Areas

No data on health assessments or sampling in the proposed recipient areas are available. During the USFWS’ line distance sampling program in 2005, blood samples were collected to document disease status, but those data were not reported in the annual reports on line distance sampling (USFWS 2006). In all years, all tortoises observed during line distance sampling also were examined for clinical signs, but those data were not reported.

Potential Alternative Recipient Areas

Health assessments were conducted and blood samples taken on seven tortoises at the Emerson Lake plot in 2011. None was seropositive for *M. agassizii* or *M. testudinum* or had nasal discharges.

No tortoises had signs of respiratory disease on the Bullion plot in 2001, 2003, or 2008 (Kiva 2008). Blood samples were drawn from desert tortoises in 2002, 2003, and 2008 to test for antibodies for *M. agassizii*, *M. testudinum*, and herpesvirus; no tortoise tested positive for any of these diseases.

2.2.5 Habitat

Proposed Recipient Areas

Habitat for the SUAs and much of the Ord-Rodman southern and western areas was described during 2008 and 2009 surveys (Karl 2010a) and discussed in Section 2.1.3, above. Because the remainder of the Ord-Rodman and Sunshine Peak recipient areas are proximal to the previously surveyed areas, it is anticipated that vegetation would be similar to that in the surveyed areas. These proposed recipient areas outside the WSA were chosen based largely on topography (following an examination of protected areas and uses). All are on bajadas and include foothills and small outcrops, so habitats should be similar to those surveyed in the study areas. Over the next three years, however, habitat will be investigated both quantitatively and qualitatively to fully describe it. A habitat model is currently being developed by NREA, the purpose of which is to model both measurable and qualitative abiotic and biotic factors that influence tortoise habitat quality. This model will be employed on the proposed recipient areas in order to refine the final recipient sites within which translocated tortoises will be released and monitored.

Potential Alternative Recipient Areas

The Emerson Lake alternative recipient area has similar habitats to that in the adjacent WSA. It lies on a lower bajadas at about 780 m (2575 ft) in elevation. The plant community is a fairly open, low diversity creosote bush-white bursage scrub. Soils are soft, loamy coarse sands with a high decomposed granite component; substrates have scattered fine gravels. Hydrology is characterized by shallow, occasional sandy washes. This part of the Bullion Training area is biologically somewhat richer than the nearby SSA. The vegetation community is a diverse creosote bush scrub alliance with many large Mojave yucca. Common perennial species include creosote bush, white bursage, Mojave yucca, white rhatany and desert senna (*Senna armata*). Washes are botanically rich with the above species plus sweetbush (*Bebbia juncea*), rayless encelia, catclaw and paper-bag bush (*Salazaria mexicana*) (Kiva 2008). The site lies on a gently sloping alluvial fan bounded on two sides by the Bullion Mountains. Narrow, shallowly incised washes with caliche deposits, and broader, shallow washes intersect the area. Elevations range from 800 to 840 m (2640 to 2772 ft).

2.2.6 Land Management and Conservation Areas

WSA

The Ord-Rodman Critical Habitat Unit and Desert Wildlife Management Area (DWMA) are located immediately north of the WSA (Figure 8). Together, they comprise over 112,000 ha (276,756 acres).

DWMAs act as reserves in which recovery actions identified by the original and revised recovery plans (USFWS 1994a and 2011a) are implemented; they are managed as ACECs by BLM. The recovery plan works in concert with critical habitat units (CHU), designated for *G. agassizii* in 1994 (FWS 1994b), by prescribing management actions to aid recovery, with critical habitat providing legal protection.

The Rodman Mountains Wilderness and Area of Critical Environmental Concern (ACEC) lie immediately north of the WSA (BLM 2005). Wilderness Areas are to be managed “to retain their primeval character and influence, without permanent improvements or human habitation... (and are to be)...protected and managed so as to preserve...natural conditions” (BLM 1995). ACECs have been established to “protect and prevent irreparable damage to important historic, cultural and scenic values; fish, wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. ...the management of ACECs is focused on the resource or natural hazard of concern ... and in some cases may involve surface disturbing actions” (BLM no date). Another small ACEC (“Upper Johnson Valley Yucca Rings ACEC”) lies along the western WSA border and a third ACEC (“Soggy Dry Lake Creosote Rings ACEC”) lies immediately south of the WSA, near Bessemer Mine Road.

The majority of the lands north of the WSA are managed by BLM. However, there are scattered to alternating private parcels, especially in the east and western areas, and three sections owned by the State of California.

SSA

The Cleghorn Lakes Wilderness abuts the eastern edge of the SUA in the SSA. The nearest desert tortoise DWMA and critical habitat are the overlapping Pinto DWMA and Pinto Mountains CHU, approximately 20 km to the south.

2.2.7 Anthropogenic Uses and Threats to Desert Tortoises

All SUAs are in the study areas, which were described in Section 2.1, above. The tip of the Johnson Valley OHV Area, about 15 km² (6 mi²), extends into the proposed Ord-Rodman recipient areas. Actual OHV use in the area is not well-documented but some of the area was surveyed during WSA surveys in 2008 and 2009, which surveyed beyond

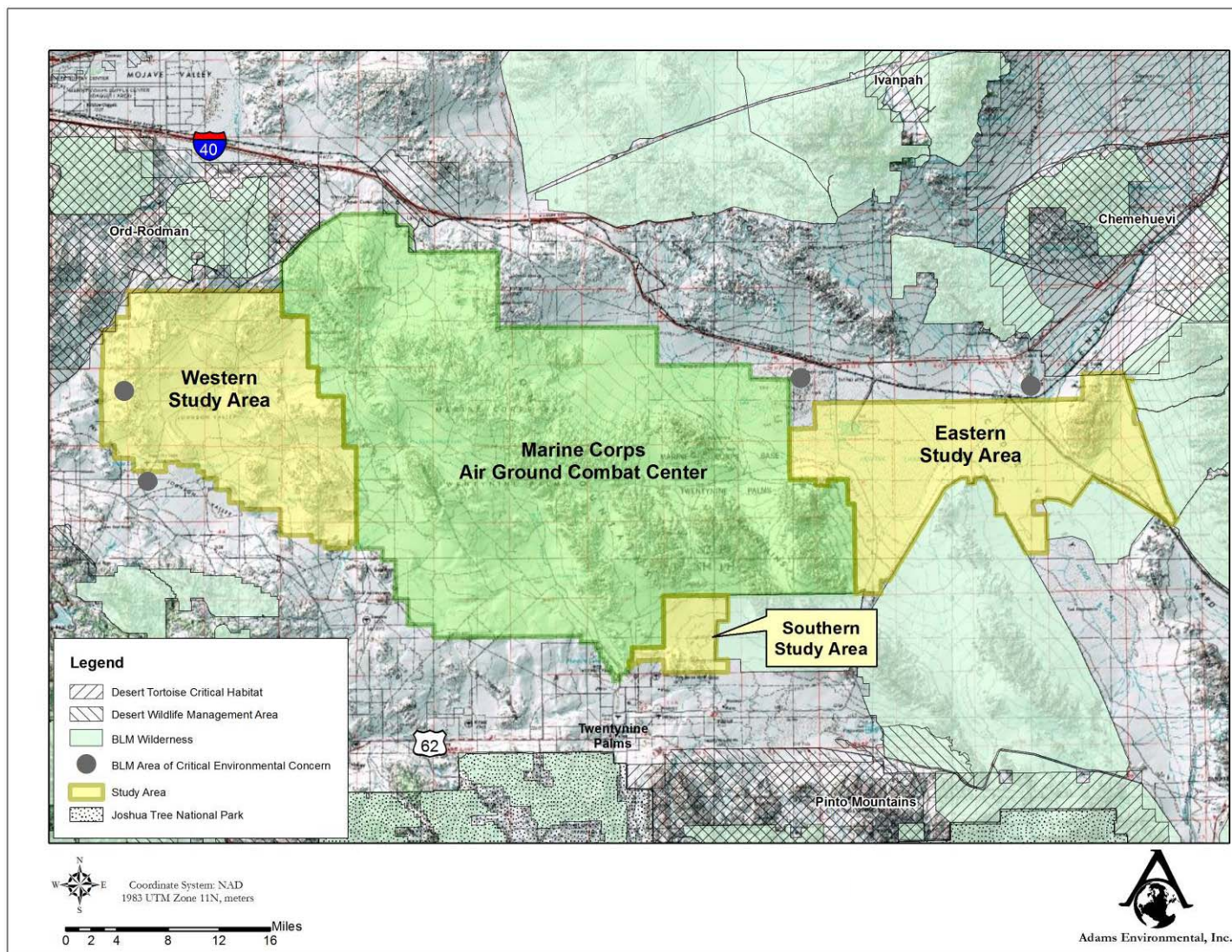


Figure 8. Conservation areas in the MCAGCC vicinity. (Source: Karl 2010a)

the current WSA boundary (Figure 6; Karl 2010a). In general, relatively little OHV use was observed in the northern WSA, compared to central and southern Johnson Valley. There were few dirt roads and those were primarily to access the set of transmission lines.

There was, however, evidence of an OHV race (markers, contestants, crushed tortoises) near the junction of the northern SUA and the proposed Ord-Rodman recipient areas.

As part of an OHV displacement study for the land acquisition and airspace establishment project, increased use in the vicinity of the proposed recipient areas was examined. The study concluded that the Ord Mountain route network would be expected to see a pronounced increase in OHV activity as a result of displaced use from Johnson Valley, due to the area's popularity and spillover from Stoddard Valley (TEC 2011). However, the study cautioned that data on reliable projections of increased OHV activity and locations were unavailable and that "projecting increases in OHV use with any certainty, by specific location with the ODA [Open Desert Area], was described by OHV enforcement experts as a near impossibility – there are too many factors, which change dynamically before they can be studied, to establish a reliable projection."

Historic use of the Ord-Rodman recipient areas includes mining in the adjacent mountains and grazing. There are several small mines scattered in the adjacent mountains, but it is unclear if any are active. The Ord Mountain cattle grazing allotment completely overlaps the proposed recipient areas. However, per stipulations in the WMP (BLM 2005), cattle grazing would be excluded during spring and fall throughout this overlap area in years when biomass production of ephemeral vegetation is below 230 lb/acre (BLM 2006).

Sunshine Peak is an on-base training area that receives extremely little disturbance. The training area is a hung ordnance area, where aircraft try to dislodge ordnance that fail to launch during training exercises. Ground activity, primarily by the Combat Center's Explosive Ordnance Division (EOD), is essentially limited to a few days per year, where EOD detonates or removes ordnance. The extent of disturbance will be assessed during upcoming surveys.

It is assumed that coyotes and ravens, as well as lesser tortoise predators, occupy the recipient areas. Because of the relatively low apparent uses and lack of nearby human habitation, it is unlikely that their numbers are higher than would be expected in a relatively natural setting. However, during upcoming surveys, ravens (individuals, nests) will be counted when observed. The area below nests of both ravens and large raptors will be searched for tortoise remains. Evidence of free-ranging dogs and coyotes will be documented and described.

2.2.8 Validity of the Proposed Recipient Areas for Translocation

There are several criteria for recipient areas that should be met for successful translocation to occur:

1. Translocation lands should be part of a larger block of lands that are either already protected or planned for protection, or feasibly could be protected by a public resource agency or a private biological-reserve organization. The site will be managed for conservation so that potential threats from future impacts are precluded.
2. Lands should be connected to occupied desert tortoise habitat or in sufficiently close proximity to known occupied tortoise habitat that unencumbered genetic flow is possible.
3. Preferably, tortoise populations on and/or near the recipient areas are depleted or depressed, so that translocation repatriates a formerly occupied site and does not conflict with carrying capacity constraints. The lands must comprise sufficiently good habitat that they are either currently occupied or could be occupied by the desert tortoise once they are protected from anthropogenic impacts and/or otherwise enhanced.
4. Habitat on the recipient areas should be suitable for all life stages.
5. Lands should not be subject to such intensive recreational, grazing, or other uses that habitat recovery would be rendered unlikely or lengthy. Nor should those invasive species that are likely to jeopardize habitat recovery (e.g., Sahara mustard [*Brassica tournefortii*]) be present in uncontrollable numbers, either on or immediately adjacent to the parcels under consideration.
6. Lands must have no detrimental rights-of-way (ROWs) or other encumbrances.

These criteria are consistent with the goals, objectives, and recovery strategies of the Recovery Plan USFWS (2011a) and USFWS *Guidance* (USFWS 2011b). The *Guidance* further requires that:

7. Disease prevalence within the resident desert tortoise population is less than 20 percent
8. The lands should be within 40 km of the impact area, with no natural barriers to movement between them, to ensure that the desert tortoises at the two sites were likely part of a larger mixing population and similar genetically
9. Sites must be at least 10 km from major unfenced roads or highways.
10. Recipient sites must include a radius of 6.5 km from release points.

Recipient areas were chosen based on their association with and/or proximity to protected lands, a lower likelihood of negative impacts, likely intact habitat, and connection to adjacent tortoise populations. Assuming that population densities are depressed (based on a pattern of declines both range-wide and locally [see Section 1.1, above]), then augmenting these areas could re-establish tortoises where they have been extirpated, thereby maintaining genetic integrity and connectivity within the population, and/or enhance population viability against stochastic events or chronic and/or gradual impacts.

The new SUAs were chosen further based on their separation from proposed military training activities and their higher tortoise densities relative to the rest of the study areas. So, based on the available information, Points 1, 2 and 8 are largely met by the currently proposed and alternative recipient areas. SUAs would receive substantially greater protection than they currently receive. They would be off-limits to OHV recreation and to military training and vehicle travel off of MSRs, with limited exceptions for Conservation Law Enforcement Officers, authorized Natural Resources and Environmental Affairs (NREA) staff, and water and maintenance crews. Based on previous surveys (see Section 2.2.3, above) tortoises are highly likely to be present in the proposed Ord-Rodman and the Sunshine Peak recipient areas, and just as likely to be depressed relative to historic densities. These populations, along with the northern SUA in the WSA are topographically interconnected and similarly connected to tortoises to the west and north. The entire area receives substantial protection, either as designated critical habitat and/or because it is surrounded by the Combat Center or designated Wilderness and ACECs. The presence of Conservation Law Enforcement Officers in and around the SUA would facilitate detection of illegal OHV activity in the proposed recipient areas to the north. While OHV activity may increase in the proposed Ord-Rodman recipient areas due to displacement from Johnson Valley, this increase is far from certain (see Section 2.2.7, above).

Similar to the WSA, the proposed recipient area (SUA) in the SSA will be protected by the military, and also abuts an existing SUA on the Combat Center and the Cleghorn Lakes Wilderness. Use of this SUA would maintain the current connections within the local tortoise population.

Both alternative sites are in SUAs on base, so they receive some protection from military activities and protection from public encroachment. A possible consideration is to upgrade these SUAs to Category 1 (i.e., restricted), from the current Category 2 designation. The Emerson Lake population is inarguably depressed over prior levels, and the Bullion area, while potentially stable now, has only been studied for 10 years. If consistent with range-wide patterns of declines, densities are probably lower there than historically.

Points 3, 4, 5, and 6 from the above list are likely. Point 7 requires testing but based on studies on base, along the east side of the WSA (see Section 2.1.2, above), it is highly unlikely that disease prevalence will exceed 20%. All of these points will be studied during the next three years. Regarding Point 9, this is true of all sites except the northeastern Ord-Rodman recipient area. The northern edge is a minimum of 5 km from Interstate 40. Finally, releases would occur in several sites within the recipient areas, pending further survey to determine the appropriate locations. The 6.5 km or other practical radius will be identified at that time.

2.2.9 The number of Tortoises that Will Be Released in Each Recipient Area

The USFWS *Guidance* recommends that post-translocation densities (translocatees plus residents) in the recipient area not exceed the 68% confidence interval from the mean

density of the relevant recovery unit (USFWS 2011b). For the land acquisition project, this would result in a post-translocation maximum of 5.55, based on a mean Western Mojave Recovery Unit density of 4.0, with a (USFWS 2011b: Table 3). However, release rates will be higher, to experimentally examine if higher tortoise densities, augmented by translocation, are warranted. Release densities (Table 7) will be, on average, double the current Ord-Rodman density from line-distance sampling, although there will be variability by release site. Because tortoise densities were much higher in the past, prior to line-distance sampling (see Section 1.1, above), and the declines may have little or nothing to do with habitat quality and carrying capacity, it is fully possible that the higher previous densities may be supportable by the existing habitat. Releasing tortoises at this density will also accommodate the 1105 tortoises projected to require translocation (Table 7).

During upcoming studies in the proposed and alternative recipient areas, habitat model factors (see Section 2.2.5, above) will be used to modify the number of tortoises that can be released in each site. The final project translocation plan also will look at existing densities, disturbance levels (current and anticipated) and other potential risks, and other factors to assess appropriate stocking densities.

2.2.10 Recipient Site Preparation

Currently, tortoise exclusion fencing is only under consideration for those borders of the SUAs that face the maneuvers or high use areas. In the WSA, this would be the southern border of the northern SUA and the entire border of the western SUA. In the SSA, the SUA would be fenced on the southwest and south. Further fencing of the SUAs or impact areas is currently not being considered, but fencing ultimately may be considered for portions of the maneuvers' high and medium intensity routes that intersect higher tortoise density areas. No fencing will be erected for proposed recipient areas north of the WSA or in Sunshine Peak. (See Section 3.1.6 regarding fencing details.)

Following further investigation of recipient areas, adaptive management measures may be implemented to eliminate or reduce risks, should they be identified, or otherwise improve the recipient sites to make them acceptable for translocation.

2.3 CONTROL AREAS

Per the USFWS *Guidance*, control sites will be approximately 10 km (6.25 mi) from recipient areas. Potential control sites are shown in Figure 7. While some associated with the WSA recipient areas are slightly closer than 10 km to the entire potential recipient area, during baseline surveys in 2012-2014, recipient sites will be carefully chosen within those recipient areas to permit appropriate control sites also to be established approximately 10 km from actual release sites. During these same surveys, control site locations will be refined and others may be considered, to ensure that they meet the goals of the monitoring and research programs.

Table 7. Experimental number of adult tortoises that might be translocated to proposed and alternative recipient areas. Stocking rates are the multipliers of the current Ord-Rodman density estimate of 7.5, based on the USFWS line-distance sampling program (USFWS 2010).

	Impact Areas			Proposed Recipient Areas				Potential Alternative Recipient Areas	
	WSA	SSA	Total	WSA SUAs	SSA SUAs	Sunshine Peak Training Area	Ord-Rodman	Emerson	Bullion
Tortoises ¹ to be Translocated	1000	105	1105						
Recipient Area Size (km ²)				48.6	11.9	60.5	77.7	10	10
Density of Tortoises following Translocation (Residents plus Translocatees) at the Following Stocking Rates:									
<i>1.0 (i.e., no tortoises translocated)</i>				7.5	7.5	7.5	7.5	7.5	7.5
<i>1.3</i>				9.75	9.75	9.75	9.75	9.75	9.75
<i>1.5</i>				11.25	11.25	11.25	11.25	11.25	11.25
<i>1.75</i>				13.125	13.125	13.125	13.125	13.125	13.125
<i>2.0 (i.e., as many tortoises are translocated as there are residents; the final density is twice the estimated Ord-Rodman density)</i>				15	15	15	15	15	15
<i>3.0</i>				22.5	22.5	22.5	22.5	22.5	22.5
Total Number of Tortoises that Could be Translocated to Each Area Per Stocking Rate									
<i>1.0</i>				0	0	0	0	0	0
<i>1.3</i>				109.35	26.775	33.75	174.825	22.5	22.5
<i>1.5</i>				182.25	44.625	56.25	291.375	37.5	37.5
<i>1.75</i>				273.375	66.9375	84.375	437.0625	56.25	56.25
<i>2.0</i>				364.5	89.25	112.5	582.75	75	75
<i>3.0</i>				729	178.5	225	1165.5	150	150

1/ All references to tortoises refer to adult tortoises. Juvenile tortoises will be translocated in the same proportion as found in the recipient site studies.

Because the potential areas are in the same watersheds and/or general area as the recipient areas, habitat, land management and uses, tortoise density, and health status is anticipated to be the same as in the recipient areas described above. As previously stated, habitat, health profile and tortoise density surveys in the next few years will quantify and describe these features.

2.4 EFFECTIVENESS MONITORING

This section presents the framework for monitoring the effectiveness of the translocation. The monitoring program presented here is an initial approach and will be refined for the Final Translocation Plan following upcoming studies and in collaboration with the resource agencies. This rigorous monitoring program also will permit the identification of specific factors or thresholds that may require the implementation of adaptive management. The latter will be developed through coordination with USFWS and State wildlife agencies, as appropriate.

Four subject areas will be investigated by monitoring, each of which is described below:

1. Survival
2. Threats to survival
3. Habitat stability/changes
4. Health and disease

Survival

Survival of translocatees is the main metric for evaluating translocation as a take minimization measure. Survival of translocated tortoises will be measured using two methods: mark-recapture plots and tracking.

Mark-Recapture Plots

Because of the size of the translocated population (1105 adults plus 2100 juveniles), tracking all tortoises is impractical. However, substantial information on survival of translocatees, as well as on population demography, repatriation, and health, can be gathered by repeated readings of mark-recapture plots where tortoises have been translocated. A total of 10 to 12, one square kilometer plots will be established in the recipient and control areas. Four will be in the control sites and eight will be in the Ord-Rodman, Sunshine Peak, and SUA recipient areas. Each plot will be re-surveyed for population density and structure every five years for 30 years. Standard mark-recapture techniques (e.g., Lincoln-Peterson) will be employed, wherein at least two passes would be completed and all tortoises captured. All captured tortoises will be weighed, measured, photographed, sexed, and described. Health assessments will be conducted and blood samples collected for all tortoises and habitat variables quantitatively measured (see sections below for the relevant methods).

Tracking

Survival will also be assessed via tracking of a subset of the translocated tortoises, wherein survival will be compared to control and recipient tortoises. It is anticipated that 1105 adults will require translocation, so 20% of those (220) will be monitored, with an approximately equal number of males and females. An equal number of control and resident (recipient) adults will also be tracked, for a total of 660 tortoises. Adults are arguably the critical size group that supports recovery because they are the reproducing group. But, monitoring smaller tortoises also permits an examination of recruitment. So, 5% of smaller tortoises (100) will be followed to monitor survival. An attempt will be made to find smaller tortoises at the resident and control sites, but because of the difficulty of finding them and the decreased effort on the non-clearance sites, a complete cohort of 200 small recipient and control tortoises is unlikely to be found.

Transmitters of appropriate size will be affixed to all study animals (see Section 3.1.4 for details of transmitters and attachment). Tortoises will be handled at capture to affix transmitters and conduct health assessments, during subsequent condition-index measurements and health assessments, and when transmitters require changing. As much as possible, all handling subsequent to the initial transmittering will co-occur. All handling time will be minimized to the extent possible to avoid stress to the animals.

Translocated, resident, and control tortoises will be tracked the first year according to the schedule in the *Guidance* USFWS (2010b). Based on several data sets on translocated tortoises (Nussear 2004, Field et al. 2007, Karl 2006), it is anticipated that translocated tortoises will have settled somewhat into newer home ranges after one year, at which time tracking will be decreased for all cohorts. Tortoises will be tracked weekly during high activity periods - April, May, October and the last half of September, every two weeks from June through the first half of September, and monthly during November through February.

After five years, the study group will be decreased to 150 tortoises (50 per cohort) and monitored via tracking for an additional five years, for a total of 10 years of tracking. Each time the tortoise is located, the behavior and location (UTM), plus other data as observed, will be recorded. Transmitters will be removed unless USFWS and State wildlife resource agencies have determined whether or not further action is warranted (USFWS 2011b).

Should a transmittered tortoise die, the cause of death will be determined to the extent possible. This information, along with the location and any other analysis that could assist the USFWS, CDFG, and BLM will be provided to these agencies verbally within 48 hours, or via e-mail within five business days. All fresh carcasses will be salvaged and submitted for necropsy upon direction from USFWS, CDFG, and/or BLM.

Threats to survival

Anthropogenic disturbances and potential risks to recovery and translocation success threats will be assessed both qualitatively and quantitatively and compared to current levels. During all tracking activities, observations of unusual raven or coyote activity, illegal or elevated legal OHV activity, or other unexpected or intense potential risks to tortoises will be documented. Included also will be other potential risks observed during the baseline studies during 2012 to 2014.

During each reading of the mark-recapture plots, predator populations and disturbance types and levels will be quantified. Raven numbers (individuals and nests) will be recorded and the area below nests of both ravens and large raptors will be searched for tortoise remains. Surface disturbance will be measured, by type and age, on vegetation transects (see below) on each plot. Qualitatively, OHV recreation, unforeseen developments, and any evidence of free-ranging dogs and/or coyotes will be documented and described. If warranted and practical, quantitative measurements may be collected on these factors.

For both general observations during project activities and focused observations on mark-recapture plots, adaptive management strategies, where necessary and applicable, will be discussed with the resource agencies to determine the best approaches for eliminating or decreasing the risks to tortoise recovery.

Habitat Stability or Changes

During each reading of the mark-recapture plots, habitat will be assessed to monitor changes or stability. On standardized transects, percent cover, density, frequency, species richness, species evenness, and robustness of perennial plants will be measured. On the same transects, hydrology and surface disturbance (see above) will be measured. On these same transects, annuals (percent cover and biomass by species), substrates and soils will be measured on stratified-random quadrats. All annuals present on each transect, including all tortoise forage species, will be inventoried. Exotic annuals will also be included in these measurements, to document spread and population increases. Perennials, soils, substrates, and hydrology will be measured every 10 years for 30 years. Annuals and surface disturbance will be measured every five years, with biomass measured on a subset of the mark-recapture plots every five years.

Health and Disease

Recipient Sites

The incidence of disease and other health issues will be monitored using body condition indices (mass to volume ratios [cf Loehr et al. 2004), clinical signs of disease, serology, and visual inspection for injuries. This will be accomplished using both telemetered tortoises and all tortoises captured on mark-recapture plots.

A subset of 50 transmitters from each cohort (i.e., 50 translocatees, 50 residents, and 50 controls) will be sampled annually during the first five years when the initial stressors from translocation are likely evident, then at 10 years when transmitters are removed. Formal health assessments will be conducted in October (prior to brumation) and possibly at other times during the year. At these times, body condition (mass to volume ratio) also will be measured (mass, carapace length, width at Marginal 5 or 6, height). Blood samples and oral swabs will be taken and analyzed annually in the fall (before 31 October), concurrent with the evaluation of condition. In addition, any time a tortoise is handled, it will be examined for clinical signs of disease.

When mark-recapture plots are conducted, health assessments will be performed and tissue samples collected as for the telemetered group. The exception will be for those plots that are worked in the spring Prior to 15 May – USFWS *Guidance* (USFWS 2011b) states that health assessments and tissue collection will not occur until after 15 May or four weeks from the time individual tortoises have become active after winter brumation. Although mark-recapture plots will be worked only at five-year intervals, this interval is consistent with time frames in Strategy 4 of the revised Recovery Plan (USFWS 2011a).

Mycoplasma agassizii, *M. testudineum*, and *herpesvirus* are the major pathogens currently being sampled, but other pathogens may be tested as their evaluation techniques become validated for desert tortoises. Blood samples will be taken via subcarapacial or jugular venipuncture; oral mucosa may be sampled with oral swabs. A physical examination, including the oral cavity, will focus on clinical signs of disease, body condition, and ectoparasites. Methods detailed in *Health Assessment Procedures for the Desert Tortoise (Gopherus agassizii): a Handbook Pertinent to Translocation* (USFWS 2011c) will be followed for all sampling techniques and equipment. Careful attention will be paid to sample collection, processing, storage, shipping and disease transmission to optimize the sampling program and minimize any risks to tortoises. If a tortoise voids, it will be re-hydrated using epicoelomic injection of sterile saline or by nasal/oral administration of drinking water. Tortoises <100mm only will be offered fluids nasally or orally.

Any health problems observed (e.g., rapid declines in body condition, perceived outbreaks of disease, mortality events) will be reported to the USFWS, CDFG and BLM such that appropriate actions can be taken in a timely manner.

Disease Enclosures

Some tortoises in the impact area may not be suitable candidates for translocation because of a moderate to severe nasal discharge, oral plaques, or other conditions that may compromise survival (USFWS 2011c). Based on the available current information on disease incidence in the project vicinity, only 4.1% (6 of 146 tortoises) along the eastern WSA boundary had abnormal nasal discharges (see Section 2.1.2, above). Using 4.1% and assuming that 1105 tortoises may need to

be translocated, then 45 tortoises may have abnormal nasal discharges. At least half of these tortoises (20) will be established in experimental disease pens to examine vertical transmission of disease (i.e., through eggs) and disease progress of individual tortoises. The pens will be on base, probably at the Tortoise Research and Captive Rearing Site (TRACRS) for protection. There are already pens at TRACRS, but should any additional pens be constructed, then any resident tortoises will be removed and relocated a short distance away (<200 m). Pen design and tortoise maintenance will follow the recommendations in Attachment 1 of the *Guidance* (USFWS 2011b). Health assessments will be conducted and blood samples taken on the schedule for all health sampling (see above). Female tortoises will be radiographed and monitored for oviposition, in order to examine vertical transmission of disease in progeny, using techniques currently permitted on the Combat Center for headstarting purposes.

2.5 RESEARCH

In addition to effectiveness monitoring, the research portion of the translocation program presented here is the initial approach and will be refined for the Final Translocation Plan following upcoming studies and in collaboration with the resource agencies.

Two main research topics will be explored, both of which are anticipated to provide robust results that are topical and important for recovery:

1. Experimental translocation densities
2. Repatriation

No other research is currently proposed. However, other post-translocation research topics offering the possibility of providing robust results that might assist in future recovery actions, including translocation, may be considered during the pre-translocation study period from 2012-2014.

Experimental Translocation Densities

The USFWS *Guidance* recommends that post-translocation densities (translocatees plus residents) in the recipient area not exceed the 68% confidence interval from the mean density of the relevant recovery unit (USFWS 2011b). For the land acquisition project, this would result in a post-translocation maximum of 5.6, based on a mean Western Mojave Recovery Unit density of 4.0 (USFWS 2011b: Table 3). However, release rates will be higher for the land acquisition project, up to 15 tortoises/km² (Table 7), double the current density of 7.5 tortoises/km² in the Ord-Rodman sampling stratum within the Western Mojave Recovery Unit. This approach is supported by the much higher tortoise densities seen in the last 15 to 30 years (see Section 1.1, above), and tests the hypothesis that the declines may have little or nothing to do with the carrying capacity of the existing habitat. Rather, the habitat may be capable of supporting higher densities

than are currently present in the recipient area. Also, this experimental approach will assist USFWS in guiding future post-translocation densities.

To address these questions, stocking densities on the eight mark-recapture plots in the recipient areas (see Effectiveness Monitoring, above) would be moderate (1.5 times the Ord-Rodman density) on four plots and high (2.0 times the Ord-Rodman density) on four plots. The four plots in the control areas would serve as the lowest stocking densities as they would receive no translocated tortoises. The location of these 12 plots, and even the number of plots, would be refined during density and habitat studies over the next three years, to maximize the quality of the research.

Survival, population density, population structure, condition indices, and health status would be measured on these 12 plots every five years for 30 years. Habitat variables, disturbance, and threats would be measured at the same time. (Methods are discussed in Effectiveness Monitoring, above.) For the first five years after translocation, a single pass (as opposed to two passes for mark-recapture), at 100% coverage, would be made over each plot to identify mortality, presence of translocatees, and approximate number of tortoises during the early phases of translocation. During each survey, all tortoises and carcasses would be recorded (by each animal's number) and clinical signs examined.

Repatriation

Repatriation is a technique wherein tortoises are translocated to a site formerly or currently inhabited by tortoises (*sensu* Dodd and Siegel 1991) in an effort to either repopulate the site or elevate the densities. But, unlike simple translocation to unfenced sites where tortoises may travel away from that site, the translocatees are fenced for a period of time so that, when the fences are removed, the tortoises remain because they have established home ranges and become part of the social hierarchy. In this way, specific locations can be augmented, a critical feature if translocation is targeting depressed, depleted or other specific areas. Results from one repatriation study in the western Mojave Desert (Karl 2006) strongly suggest that the technique has merit.

Repatriation experiments associated with the land acquisition project will evaluate this technique as a recovery action, especially for depressed or depleted populations. Four to six sites, each 2.59 km² (1 mi²) in size, will be identified on which tortoise exclusion fencing (see Section 3.1.6, below, for fencing details) will be established around the perimeter. The most likely locations will be on the proposed SUAs. Other sites will be explored in the next few years based on upcoming surveys, as well as refinements and changes (if any) in project maneuvers in the WSA.

The number of tortoises that will be translocated to these sites will attempt to result in post-translocation densities of residents and translocatees that approximate historic densities (Table 8). It is assumed that the SUAs hosted higher densities than have been documented in the last decade, based on earlier surveys and documented declines. In total, approximately 110 tortoises will be translocated to the repatriation sites.

Table 8. Number of tortoises to be translocated to four potential repatriation sites.

Proposed Repatriation Area	Current Tortoise Density¹ (# tortoises/km ²)	Post-Translocation Density (# tortoises/km ²)	Number of Tortoises to be Translocated
Northern SUA in WSA – two sites	12.9	26	
Site 1			13 x 2.59 = 34
Site 2			13 x 2.59 = 34
SSA SUA – two sites	7.9-8.0	16	
Site 1			8 x 2.59 = 21
Site 2			8 x 2.59 = 21
Total			110

Tortoises in the repatriation study will be transmittered and monitored for survival and general health through body condition indices, clinical signs, and serology identically to the methods and schedule identified above in the section on Effectiveness Monitoring. Tracking will follow the schedule for all telemetered tortoises in the translocation program, during which locations, burrow use, and behavior will be recorded. The tortoise exclusion fencing will be removed two years after initial translocation to assess site repatriation and permit tortoises to become members of the greater population (i.e., rather than segregated from the population). Site repatriation will be assessed by continued monitoring of subsequent tortoise movements and comparing them to those of control tortoises. (The same control used for tracking the larger group of translocated tortoises will be used.) Tracking will end at Year 10, consistent with the cessation of tracking on the larger telemetered group.

Variations in removal time of fences, the number and size of repatriation sites, and other experimental features may be refined prior to the Final Translocation Plan if newer information suggests such changes.

3.0 PHYSICAL PROCESSES OF TRANSLOCATION

The following section describes procedures to be conducted prior to and during translocation. Several must be completed and approved by USFWS before translocation can begin. In addition, no tortoises will be translocated until the Biological Opinion is issued and certain other conservation actions completed per the BA (e.g., land transfer

[Navy 2011a]). In addition, all surface-disturbing activities that may affect cultural resources will be conducted in coordination with NREA..

3.1 PROCEDURES APPLICABLE TO ALL ACTIVITIES

3.1.1 Authorized Handlers

USFWS describes a single designation for biologists who can be approved to handle tortoises - “Authorized Biologist” (AB) (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt; USFWS 2009a). Such biologists have demonstrated to USFWS that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Specific ABs will be approved to conduct specific tasks, including such specialized tasks as health assessments, blood sampling and transmitter attachment. Only those biologists authorized by USFWS and CDFG can conduct specific tortoise handling tasks and clearance surveys. For USFWS, ABs are permitted to approve specific desert tortoise monitors to assist in certain tasks, at the AB’s discretion, without further approvals from USFWS. Direct supervision of monitors by the AB (i.e., voice and sight contact) is required for all clearance surveys and certain other specialized tasks, but limited tortoise handling (e.g., removal from harm’s way) may occur without supervision, following appropriate training and approvals from the ABs.

3.1.2 Handling Techniques and Temperatures

All tortoise handling will be accomplished by techniques outlined in the USFWS *Field Manual* (2009b: Sections 7.6-7.8), including the most recent disease prevention techniques (e.g., USFWS 2011c).

Handling will adhere to USFWS (2010b) handling guidelines for temperatures which state that tortoises can only be handled when air temperatures, measured at 5 cm (2 in) above the ground (shaded bulb), are not expected to exceed 35°C (95°F) during the handling session. If the air temperature exceeds 35°C during handling or processing, desert tortoises will be kept shaded in an environment where the ambient air temperatures do not exceed 32.7 °C (91°F) and air temperature does not exceed 35°C. The desert tortoise will not be released until air temperature at the release site declines to 35°C.

Tortoises must go underground to escape surface heat at ground surface temperatures of 43°C (109°F) (Karl unpub data) to 45°C (113°F) (Zimmerman et al., 1994). Because surface temperatures can easily exceed 43°C when air temperatures at two inches are still below 35°C, the more conservative temperature will govern all tortoise handling described in this Plan, to minimize harm to tortoises. In other words, the USFWS guidelines will be followed except in situations where ground temperature exceeds 43°C.

Releases at translocation should occur when air temperatures at 5 cm (2 in) above the ground surface range from 18-30°C (65-85°F) and are not forecasted to exceed 32°C (90°F) within 3 hours of release or 35° (95°F) within 1 week of release (USFWS 2011b).

The rationale for the higher temperature constraints is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area prior to the onset of lethal daily temperatures. Additionally, forecasted daily low temperatures should not be cooler than 10° C (50°F) for one week post-release.

3.1.3 Data Gathered During Initial Capture

Each captured tortoise will be processed at initial capture. This will apply to baseline surveys during 2012 to 2014, and clearance surveys. The gender, carapace length, width along the widest area between and inclusive of Marginals 5 and 6, height at the third vertebral, distinguishing morphology, clinical signs of disease, injuries (location, severity, source, state of healing), capture site location and description, and the amount of void, if any, will be recorded. In addition, the tortoise will be photographed and drawn. Each tortoise will be assigned an individual number, with a number series to be provided by USFWS. Marking techniques will be approved by USFWS, but temporary marks using very small epoxy numbers (e.g., clear epoxy over a small, indelible number on a correction fluid [Wite-Out®] background) on a costal or interior marginal area that receives little to no abrasion are suggested, with a project-specific identifier. Such numbers will last for several years.

3.1.4 Transmitters

Larger tortoises will receive Holohil R1-2B transmitters (24 mm wide by 11 mm thick; 14.5 g; www.holohil.com); juvenile tortoises will receive smaller transmitters (e.g., Holohil BD-2 – 2.0 g), appropriate for their mass and size, in no case >10% of the tortoise's mass. Transmitters will be epoxied to a carapace scute using five-minute gel epoxy. For males and juveniles, transmitters will be affixed to the fifth vertebral; for females, transmitters will be affixed to the anterior carapace in the most appropriate location for the animal's shell shape that will preclude interference with righting. The transmitter antenna will be fed through a plastic sheath with a diameter slightly greater than the antenna. This sheath will be epoxied low on the carapace, just above the marginal scutes, and split at the scute seams (growth areas) to preclude distortion of the tortoise's shell during growth. This technique permits the antenna to remain protected from abrasion, but move freely, thereby not affecting tortoise growth. Because the antenna sheath is tightly curved on a very small tortoise, potentially constricting antenna movement with subsequent growth distortion, much more of the antenna will remain free on small tortoises. Transmitter specifics (manufacturer, serial number, frequency, installation and all change dates) will be recorded in a project spreadsheet for all tortoises. Transmitters will be changed as necessary, earlier than battery life suggests or when the units appear to be malfunctioning.

3.1.5 Tortoise Transportation and Holding

Tortoises that only need to be moved a few hundred feet (e.g., during fencing) will be hand-carried to the release site. Each tortoise that is hand-carried will be kept upright and the handler, wearing disposable examination gloves (one pair per tortoise), will move the

tortoise as quickly and smoothly as possible. Tortoises that must be moved farther from the capture site or temporarily held in a climate-controlled situation will be sequestered in individual, sterilized plastic tubs with taped, sterilized lids or single-use cardboard boxes with lids. During transport by vehicle, the tortoise tub will be kept shaded and the tub will be placed on a well-padded surface that is not over a heated portion of the vehicle floor. These measures are consistent with USFWS guidelines (2009a: Section 7.10).

Depending on environmental conditions and hydration states, tortoises to be translocated may need to be hydrated within 12 hours before release, according to existing protocols (USFWS 2011b). The latter may include epicoelomic injection of sterile saline or nasal/oral administration of drinking water, at rates identified in USFWS (2011c). Tortoises <100mm will only be offered fluids nasally or orally. The tortoise's mass following this procedure will be recorded. Should a tortoise void between capture and release, it will be re-hydrated using these techniques and thoroughly rinsed to remove potential attracting odors to predators.

3.1.6 Exclusionary Fencing

Fence construction may be completed during any time of the year (USFWS 2011b).

Exclusion fence material will be galvanized one-inch by two-inch vertical wire mesh fence, extending at least two feet above the ground and buried at least one foot. Although unlikely, where burial is impossible, the mesh will be bent at a right angle toward the outside of the fence, at or below ground level, with the bent portion anchored by stakes and further secured by rocks and soil to prevent tortoises from digging under the fence. Tortoise-proof gates will be established at all site entry points, to remain closed except during entry by vehicles. If shown to be effective and not potentially dangerous to tortoises, tortoise "cattle guards" may be installed instead of or in addition to gates.

Temporary fencing will follow guidelines and materials for permanent fencing except in very temporary situations, when silt fencing may be used. Rebar may replace t-stakes or chain link poles for temporary fencing. In both cases, supporting stakes will be spaced sufficiently (e.g., ≤ 8 ft for wire mesh; ≤ 5 ft for silt fencing) to maintain fence integrity. Fencing may be buried if it would not create a biologically significant disturbance; where surface disturbance could be biologically significant, it will be bent outward at the ground level, with the bent portion tacked and/or held down by rocks, soil, and/or ground staples; anchors will be driven a minimum of every two feet.

All permanent exclusion fencing will be inspected monthly and during/immediately after all rainfall events where soil and water flow through washes or overland and could damage the fence or erode the soil underneath. Temporary fencing will be inspected at least weekly if activities are occurring in the vicinity that could damage the fence. Any damage to any fencing, either permanent or temporary, will be repaired immediately. If it cannot be repaired immediately, any gaps that are open to tortoise habitat will be continuously monitored until the gap can be repaired, to ensure that a tortoise has not

entered the site through the gap. For permanent fencing, gaps must be repaired within two days.

3.2 CLEARANCE AND TRANSLOCATION DURING SPECIFIC PROJECT PHASES

Tortoise clearance and translocation may occur during fence construction on the SUAs and repatriation sites and prior to the first MEB exercises.

3.2.1 Exclusionary Fencing

Fencing may occur on those sides of the SUAs that are near proposed maneuver areas, on the repatriation sites, and potentially on other areas to exclude tortoises from high-use areas (e.g., OHV areas). Temporary fencing may be used to exclude tortoises until the permanent fence is installed or where the AB believes that it would provide better protection than monitoring by BMs.

Surveys and Monitoring during Fence Construction

Within 24 hours prior to fence installation, biologists will survey the staked fenceline for all burrows that could be used by tortoises and for tortoises. Surveys will provide 100% cover for all areas to be disturbed by fencing and a swath of at least 90 ft centered on the fenceline, using 5-m-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the burrow size and occupancy recorded; if not occupied, indications of how recently the burrow was used will be recorded. Occupancy will be determined by a combined use of reflective mirrors, probing, tapping the entrance, listening, and/or scoping with a fiberoptics scope. In all cases, occupancy will only be verified only if all interior edges of the burrow can be felt, such that a “hidden” chamber at the end is not missed. Any tools used inside a burrow that could be used by a tortoise will be disinfected before use in another burrow, via the most recent disease prevention techniques (e.g., USFWS 2011c). Burrows may be flagged, if it will not attract poaching. (Flagging also may attract predators, but can be placed at a standardized distance and direction from burrows.)

Because fencing does not need to follow straight lines or property boundaries, all burrows over 0.5 m meter in length, or any active burrows, will be avoided to the side of the fence opposite intensive future MEB exercises. Shorter burrows will be visually and tactilely examined for occupancy by tortoises and other wildlife. If occupancy is negative or cannot be established, the burrow will be carefully excavated with hand tools, using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994), including disinfection techniques for all tools.

All fence construction will be monitored by approved biologists to ensure that no desert tortoises are harmed. The level of monitoring will depend on the specific fencing activity,

but at least one BM will accompany each separate construction team, such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a BM. Maps of burrows from the pre-construction survey will be provided to all BMs to assist in protecting tortoises. Such maps will also be potentially useful for relocating tortoises.

If exclusion fencing is installed when tortoises are known to be active, either from spring through fall or in winter during unusually warm weather, then all installed exclusion fence (partial or complete) will be checked 2-3 times daily for two weeks to ensure that no tortoise is fence-walking to the point of exhaustion or overexposure. If midday temperatures are above thresholds at which tortoises must go underground to escape heat (approximately 42°C ground temperature), then one of the fence checks should occur one hour prior to this threshold being reached. This same process should occur for the first 2-3 weeks of the activity season if the fence is installed in winter, when tortoises are underground.

Any fence-walking tortoise would be relocated as described below in Tortoise Disposition during Fence Construction.

Tortoise Disposition during Fence Construction

All tortoises found during fencing will become part of the translocation study, either as translocatees (if moved from fenced portions of the maneuvers' routes) or residents. However, none will be translocated until such time as the translocation begins for the entire cohort. All will receive health assessments, if they have not been previously assessed, and transmitters will be attached.

3.2.2 Clearance Surveys in the Acquisition Areas

A clearance survey for tortoises and nests will be conducted inside the designated MEB medium- and high-intensity areas, in the autumn prior to the initial MEB exercises the following year. At this time, this is anticipated to occur in Fall 2014, with translocation occurring late in the fall or the following spring. Tortoises will be transmittered at this time and a current health assessment and blood sampling completed, if one has not been done in the previous year. All tortoises will be monitored *in situ* until translocation the following spring. A translocation review package, including a disposition plan, health assessment sheets will be submitted to the USFWS for review (USFWS 2010b). Juvenile tortoises that are too small to wear transmitters will be moved to established juvenile pens at TRACRS or SUAs where they may become part of the head-starting program or be held until translocation the following spring.

Clearance surveys during September and October will coincide with heightened tortoise activity to maximize the probability of finding all tortoises. Per USFWS (2009b) guidelines, surveys will include at least two passes. All tortoise sign will be mapped and evaluated (e.g., type, age, size) during all passes, and all scat collected. During subsequent passes, areas where fresh scat is found will prompt concentrated searches. If,

on the second pass, a tortoise is found, *or* no tortoise has been found where there is a concentration of recent sign, *or* fresh scat or burrows are found without an associated tortoise, then a third pass will be conducted in the area of sign. On each subsequent pass, an attempt will be made to view all shrubs and the terrain from as many angles as possible. To achieve this, transects programmed into GPS units will be either perpendicular, parallel but offset, and/or approached from the opposite direction on each subsequent pass (Karl and Resource Design Technology, Inc., 2007).

Transects will be spaced a maximum of 5 m (15 ft). Transects narrower than 5 m wide will be used if dictated by dense shrub vegetation or where visibility is otherwise compromised. Generally, burrows are excavated and collapsed during clearance surveys, to ensure that all tortoises have been found. However, the training areas will not be fenced, so tortoises will be able to move into those areas. Furthermore, other wildlife use the burrows. So, only those burrows that are fresh will be excavated to determine occupancy, but none will be collapsed. To assist the identification of currently used burrows, all burrows will be inspected and assessed for occupation or recent use by tortoises, on each pass, gated with small sticks along the entrance to detect future use, mapped and flagged. During excavation, attention will be given to potential tortoise nests (see below). This method also will be used the following spring, during translocation, if no transmittered tortoise is in the burrow.

Tortoises will be translocated the following spring at least one week before daily, midday temperatures are expected to exceed 32°C (90°F) air temperature (at 5 cm) or 109°F (43°C) ground surface temperature, whichever is lower. The rationale is that tortoises must find or dig new refuges in the potentially unfamiliar translocation area, prior to the onset of lethal daily temperatures. But, it is always important to consider that project scheduling may change from the current, anticipated schedule. This could result in clearance surveys being conducted at a later date or outside temperatures that are higher than the USFWS guidelines for translocation. For instance, even though clearance surveys are permitted to be conducted during periods of elevated tortoise activity - April, May, September and October-, much of this period is well past the time when it is safe to translocate in spring or prior to safe, autumn translocation temperatures. In most cases, tortoises would be monitored in situ, via telemetry, until the next period when ambient temperatures permit translocation. In all cases where a change in schedule would alter the methods in this translocation plan, any new approach will be submitted to and approved by the USFWS prior to translocation.

3.2.3 Final Surveys on Recipient and Control Sites

A search of tortoises on the recipient and control sites will be conducted during the Spring 2014 and during autumn when clearance surveys are conducted. During this survey, the designated number of resident and control study animals (see Sections 2.4 and 2.5, above) will be sought, transmittered and assessed for health (visual assessments and blood sampling). Survey data will be submitted on the translocation review package submitted to USFWS following Fall 2014 surveys of the impact area.

3.2.4 Translocation

No tortoise will be moved without USFWS approval of the Final Translocation Plan and the translocation review package. Tortoises will be moved under the temperatures and handling constraints identified in Section 3.1., above. All tortoises will be released under shrubs and the UTM coordinates recorded. Artificial burrows may be dug with gas-powered augers. The USFWS (2011b) recommends releasing tortoises to unoccupied shelter sites but this is problematic on two levels. Such sites need to be found, which could be difficult even though the sites will have been previously surveyed. Secondly, during an 11-year study of over 130 tortoises, it was observed that tortoises typically did not use the burrows of other tortoises, even unoccupied burrows (AE Karl, unpub. data). (Some had alliances with one or several tortoises and were often found together with these same tortoises in the same burrow. But, it was extremely rare to find them in a different tortoise's burrow.)

Juvenile tortoises, especially those under 4.4 inches (110 mm) in length, are highly subject to depredation by canids, badgers, and ravens, and require special consideration for successful translocation. Depending on the number of juveniles that are translocated, one or more predator-proof enclosures may be constructed in the northern WSA SUA and SSA SUA to facilitate safe translocation. Materials will either be five-foot-tall "Non-Climb", two- by four-inch vertical mesh fencing, buried at least one foot and with avian netting over the top, or other suitable predator-proof construction (e.g., TRACRS design). The size of the enclosures would depend on the number of tortoises found, but would be a minimum of 8 m x 8 m in diameter, or larger as necessary, to accommodate more juvenile tortoises and/or a longer period of penning. (Morafka *et al.* 1997 successfully penned juvenile tortoises at the density of 152 to 305 animals per hectare [62 to 123 tortoises per acre].) All pens will be monitored daily until all juvenile tortoises are translocated, to ensure that predators are not damaging the enclosure. Juveniles may be translocated passively or actively, depending on predator interest in the enclosure, juvenile tortoise behavior in the enclosure, or other information. Modifications to the design and process will incorporate new and relevant head-starting techniques used at TRACRS.

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching is typically completed by October (Henen and AE Karl, unpub. obs.). In the event that nests are found between April 15 and October 31, the nests will be moved. Eggs will be inspected to determine if they are viable and, if so, will be moved to an identical microsite (e.g., cover, plant species, soil type, substrate, aspect) on the recipient sites using standard techniques (e.g. Desert Tortoise Council 1994, USFWS 2009b). Translocated nests will be fenced with open-mesh fencing (e.g. 3-5 cm wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted by human scent to the new nests. Open-mesh fencing or avian netting also will be installed on the roof of the nest enclosure to prevent predator entry. Nests will be monitored from a 30-foot distance once a month until late November, at which time they will be excavated for examination. If possible, hatchlings will be weighed, measured,

photographed, described and marked. Alternatively, hatchlings will be released to nearby tortoise or rodent burrows (Henen pers. obs.)

All transmittered translocated tortoises will be located via telemetry daily for the week following translocation to ensure that no tortoise is compromised and to help avoid losing the tortoise's signal if it walks out of transmission range.

Desert tortoises that are not suitable for translocation due to moderate to severe nasal discharge, oral plaques, or other conditions that might affect survival (USFWS 2011a), and are not being used for the disease study (see Section 2.5, above) may be sent to an agency-approved facility where they will undergo further assessment, treatment, and/or necropsy.

3.2.5 Subsequent Clearances Prior to Maneuvers

During each year when maneuvers are conducted in the land acquisition area, clearance surveys would be conducted in the high- and moderate-impact areas to remove remaining desert tortoises (Navy 2011b). For any tortoise found, the standard measurements and assessments that were used on other tortoises will be completed and the tortoise numbered. Pending USFWS approval of the translocation review package, all tortoises that are suitable candidates for translocation, based on the health assessment, will be translocated to the designated recipient sites, but not in a mark-recapture plot area. All clearances will be consistent with methods described above.

4.0 REPORTING

Per the USFWS *Guidance* (USFWS 2011b), a reporting schedule will be developed during the upcoming planning process and will be delineated in the Final Translocation Plan.

5.0 ANTICIPATED SCHEDULE

Table 9 identifies the approximate schedule for translocation activities, as discussed in this plan and as are currently known.

Table 9. Schedule for translocation activities.

Date	Activity
2011	Submit General Translocation Plan
2012-2013	Recipient and Control Areas:
	Evaluate current health status, density, habitat features, risks, and land uses
	Refine site locations
2013-2014	Impact Area:
	Evaluate density
Spring 2014	Recipient and Control Areas:
	Begin surveys for study cohorts and attach transmitters/health assessments
Summer 2014	Submit Final Translocation Plan
Fall 2014	Impact Area:
	Clearance surveys; conduct health assessments, attach transmitters, monitor tortoises <i>in situ</i>
	Submit translocation review package to USFWS
	Recipient and Control Areas:
	Finish surveys for study cohorts and attach transmitters, conduct health assessments
	Build fences, disease pens and other enclosures
Spring 2015	Impact Area:
	Translocate tortoises and initiate monitoring program

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APPENDIX A-3

MARCH 2016 TRANSLOCATION PLAN

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**DESERT TORTOISE
TRANSLOCATION PLAN
FOR THE
MARINE CORPS AIR GROUND
COMBAT CENTER
LAND ACQUISITION**

**Natural Resources and Environmental Affairs Division,
Marine Corps Air Ground Combat Center
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March 3, 2016

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DESERT TORTOISE TRANSLOCATION PLAN FOR THE MARINE CORPS AIR GROUND COMBAT CENTER LAND ACQUISITION

1.0 INTRODUCTION

1.1 BACKGROUND

The Marine Corps Air Ground Combat Center (MCAGCC) at Twentynine Palms, California (the “Combat Center”) is a unique Marine Corps training installation that provides a realistic battlefield environment for live-fire maneuvers. A large-scale Marine Air Ground Task Force (MAGTF) training area would include areas on the existing Combat Center as well as additional lands west and south of the Combat Center, currently known as the Western Expansion Area (WEA) and the Southern Expansion Area (SEA)¹, respectively. Associated training would enable Marine Expeditionary Brigade (MEB)-level training exercises, involving large-scale, integrated, live-fire maneuvers. MEB training exercises and supporting activities are detailed in the *Biological Assessment for the Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training* (BA; Department of the Navy [Navy] 2011a).

The BA (Navy 2011a) identified that Agassiz’s desert tortoise (*Gopherus agassizii*), a federally and state-listed threatened species, is likely to be adversely affected by the proposed land acquisition and airspace establishment action. The US Fish and Wildlife Service (USFWS) issued a biological opinion (BO) in response to the BA (USFWS 2012). Several conservation actions were recommended in the BA, and approved in the BO, among them a plan to translocate tortoises from high & medium impact areas in the WEA and SEA (Figure 1) prior to training exercises. High-intensity battle activity (i.e., that likely to result in high-intensity disturbance) would occur in the more level, gently sloping terrain of the project area. While steeper and rockier areas likely would be subject to less disturbance (typically medium- or low-intensity disturbance), certain vehicles and equipment would be used to fight from covered terrain, such as rocks and reverse slopes of hills that provide cover. Wheeled re-supply and other vehicles would regularly use the Main Supply Routes (MSRs) in the project area during training.

Soil and vegetation necessary for desert tortoise habitat would be expected to be severely degraded or lost in high intensity use areas; and degraded, if not lost, in medium-intensity use areas (Navy 2011a). The proposed action is anticipated to result in major degradation (i.e., complete or nearly complete loss of vegetation and disruption of substrates) of an estimated 4,273 ha (10,559 ac) of occupied desert tortoise habitat in the high-intensity disturbance zone of the study areas. MEB training and MEB Building Block training

¹The expansion areas were originally called “Study Areas” and “Acquisition Areas”. For purposes of this plan, all are now called “Expansion Areas”.

would also result in a lesser degree of degradation of an estimated 39,067 ha (96,537 ac) of occupied desert tortoise habitat in the medium-intensity training disturbance zone of the project area.

MEB training for 50 years is not compatible with the continued existence of desert tortoises in the high and medium intensity areas. If not translocated, an estimated 1105 adult tortoises and potentially 2100 juveniles would be lost from these zones of the WEA and SEA due to the intensity of training exercises (Navy 2011a). Such a loss of tortoises and tortoise habitat is not compatible with recovery of this threatened species (Navy 2011a). These numbers represent 34% and 23%, respectively, of the adult and juvenile tortoises currently living in the local population. Desert tortoises have experienced long-term and severe declines throughout their geographic range in the past two decades (Karl 2004 and 2010, McLuckie et al. 2006, Boarman et al. 2008, USFWS 2015b). Further losses of over 1000 breeding age tortoises and 2000 smaller tortoises would further compromise species recovery.

In addition, the intensive degradation of over 43,000 ha (100,000 ac) would eliminate that habitat and/or leave it in sufficiently poor quality to render it largely unusable to tortoises. Any surviving tortoises from those areas would need to re-locate to areas with intact habitat that could support them. Since the areas slated for maneuvers in the WEA are in multiple places, tortoises dispersing from the MEB disturbance zones could move into equally dangerous areas. Actively translocating these tortoises to designated locations with suitable habitat that is safe from further anthropogenic degradation, would optimize dispersal.

Translocation is necessary to support the continued existence of this population by maintaining tortoise abundance and genetic integrity. Long-term monitoring of the translocation efforts for this large cohort of tortoises will provide valuable information on translocation efficacy as a tool for species recovery. Studies that can be completed ancillary to translocation will provide important information for recovery methods. Such monitoring and studies are consistent with strategies outlined in the revised desert tortoise Recovery Plan (USFWS 2011a). In particular, the translocation of tortoises to areas with depressed or depleted populations is consistent with Recovery Plan Strategic Element 3. Monitoring survival, disease, habitat, and threats in the studies are consistent with Strategic Element 4. Performing research on translocation effectiveness, constrained dispersal, stocking densities, habitat, and disease are consistent with Strategic Element 5.

1.2 PRE-TRANSLOCATION INVESTIGATIONS AND ACTIVITIES

The BO required that three years of baseline data be collected prior to translocation. Translocation is planned for early Spring 2016, prior to the initial MEB exercises in Summer 2016. This schedule prompted a substantial amount of pre- translocation activities:

- An initial General Translocation Plan (GTP) was developed in December 2011 (Karl and Henen 2011) to provide a basic framework for translocation and further investigations prior to translocation in 2016.
- Recipient and control sites were suggested in the GTP based on a desktop analysis of several factors (e.g., proximity to WEA and SEA, elevation, land uses, long-term protection). Since 2011, these sites have been modified, deleted, and added based on a combined approach of surveys, agency consultation (USFWS, Bureau of Land Management [BLM], and the California Department of Fish and Wildlife [CDFW]), investigations of current and future land uses, and examination of data from other projects originally targeted for those sites.
- Beginning in 2012 and ongoing, field surveys have been performed to examine translocation-associated factors in both the impact areas and the recipient and control sites. These factors include:

Tortoise Density

- ◊ Mark-recapture – Established 6 new, 1 km², mark-recapture plots in the WEA (3) and nearby translocation area (3) in 2013; established an additional 8 plots in translocation areas in 2015.
- ◊ Tortoise Regional Estimate of Density (TRED) transects (Karl 2002) in the WEA and SEA (2012) and translocation areas (2013-2015).

Habitat Analyses

- ◊ Qualitative and quantitative transects in the WEA, SEA, and translocation areas, 2012-2015.

Baseline Disease Status and Behavior

- ◊ Health assessments, with tissue sampling, on 359 tortoises in two translocation areas and the impact areas, Fall 2013 and Spring 2014.
- ◊ Attached transmitters to 114 tortoises in two translocation areas and the impact areas, Fall 2013 and Spring 2014; tortoises tracked monthly after initial two weeks of heightened tracking.

Predation

- ◊ Focused raven abundance and nest surveys in the translocation area, Spring 2014 (pilot study) and Spring 2015, continuing.
- ◊ Canid-related trauma - analysis from health assessments on recipient and control sites, 2015 surveys.

Genetics Analysis

- ◊ Assessment of genetic differentiation among the impact and translocation areas, using a subset of 135 samples from the impact areas and disparate recipient and control sites.

- We completed tortoise clearance surveys on over 205 km² comprising the WEA and SEA high and medium impact areas, from September 2014 through October 2015. In brief, clearance surveys coincided with heightened tortoise activity in spring and fall to maximize the probability of finding all tortoises.

Two complete passes were walked, with transects spaced at five-meter intervals; the second pass was walked perpendicular to the first to maximize observing all surfaces. Teams were limited to five people for maximum search efficiency, with the central navigator following designated coordinate lines (“UTMs”) to ensure complete coverage of the survey area. Recent tortoise sign was mapped and qualified relative to size and age to assist in finding every tortoise associated with fresh sign; additional, concentrated surveys occurred where no tortoise was initially found near any fresh sign. Similarly, when new hatchlings were found, a concentrated search was employed to find other hatchlings from the clutch.

All tortoises of adequate size were transmittered; juvenile tortoises too small to wear transmitters were moved to new holding pens at Natural Resources and Environmental Affairs Division’s (NREA’s) Tortoise Research and Captive Rearing Site (TRACRS). *In situ* monitoring of all tortoises with transmitters was accomplished by monthly tracking, following an initial two-week period of intensive tracking after transmitter attachment. We conducted health assessments on all tortoises per USFWS current guidelines (USFWS 2015a; see Section 6.3, below, for details of these techniques.)

To help understand mortality rates, we recorded each tortoise shell remain that was sufficiently complete to represent a single tortoise. Each shell was sexed, sized, and aged relative to time since death, and the cause of death was recorded, if determined.

- Holding pens with 186 individual units were built in 2015. These were constructed at the TRACRS headstarting facility to resemble the existing pens.
- Tortoises were sought on the recipient and control sites in Fall 2015 to transmitter resident and control tortoises. We used standardized, 10 meter-wide transects throughout most of each site to sample representative habitats that would be occupied by translocatees and residents, adding focused searches in better habitats. Shell remains were recorded as for clearance surveys. We performed health assessments on all transmittered tortoises, plus additional tortoises encountered to augment our knowledge of each site’s disease status.

This final plan incorporates these additional data and analyses, as well as collaboration with the resource agencies.

2.0 IMPACT AREA BASELINE DATA

2.1 NUMBER OF TORTOISES TO BE TRANSLOCATED

We found 1,410 tortoises during clearance surveys of government lands in the WEA and SEA, of which 1,175 adult and juvenile tortoises were transmitters and an additional 235 smaller tortoises were transferred to TRACRS holding pens (Table 1). Private lands within the WEA that are still in negotiation should provide approximately 18 additional tortoises. Subtracting lost tortoises due to inactive transmitters and mortality, MCAGCC anticipates translocating 1,138 transmitters next spring, plus juveniles from the holding pens that have grown large enough to avoid raven predation.

The BO (USFWS 2012) requires MCAGCC to perform subsequent clearance surveys on any square kilometer where at least three tortoises were found on the previous survey. Estimates of survey efficacy (Karl 2002) combined with findings from previous surveys suggest that another 104 adult and juvenile tortoises will be found in these subsequent surveys. After five years, we estimate that the cumulative total of tortoises to be translocated will approximately equal 1,495 tortoises, including 998 tortoises ≥ 160 mm in carapace length (MCL) and 497 smaller tortoises (Table 1).

Table 1. Cumulative number of tortoises expected to be translocated from the impact areas, including those already found (Found) and those anticipated from future clearances (Additional). MCL=Midline Carapace Length.

Tortoises	≥ 160 mm MCL			<160 mm MCL	
	Male	Female	Unknown Sex	Transmitters	Holding Pens
Found:					
WEA	457	334	43	218	235
SEA	<u>41</u>	<u>40</u>	<u>1</u>	<u>4</u>	<u>0</u>
<i>Subtotal</i>	498	374	44	222	235
Total for Size Group	916			457	
Additional:					
13 km ² of Private Lands		12		6	
Subsequent Annual Clearances ¹		70		34	
Total	998			497	

¹ The number of additional tortoises is based on finding 74% of the tortoises present on each pass (Karl 2002), or 93% cumulatively after two passes.

The actual number of tortoises ultimately found may exceed estimates, which are based on density inside the impact area. Our surveys capture not only tortoises that may live primarily inside the impact area, but those outside whose home ranges overlap the impact area. Based on a 720 m home range diameter (TRW 1999), any male tortoise within 720 m of the impact area could be captured. The large edge-to-interior ratio of the battalion routes, especially, but also the boundary of the main objectives, increases the possibility that additional tortoises will be captured.

3.0 RECIPIENT AND CONTROL SITES

3.1 SITE CHOICE AND CRITERIA

Recipient and control sites were identified and refined relative to size and location following the three-year program of surveys, literature review, and discussions with the resource agencies and stakeholders. The final number of tortoises found during the clearance surveys further dictated the number and sizes of the sites.

Recipient areas must meet several important criteria to ensure that translocation will successfully support tortoise recovery:

- Sites should be part of a connected system of occupied desert tortoise habitat.
- Preferably, tortoise populations on and/or near the recipient areas are depleted or depressed, so that translocation repatriates a formerly occupied site and does not conflict with carrying capacity constraints.
- The lands must comprise sufficiently good habitat that they are either currently occupied or could be occupied by the desert tortoise. Habitat on the recipient areas must be suitable for all life stages.
- Sites that are protected or receive adequate protection because of proximity to conservation lands are preferred.
- Lands should not be subject to elevated threats (e.g., predation, disease, exotic invasive plant species) or intensive historic, current or future land uses (e.g., recreational use, development, habitat degradation) that could compromise habitat recovery or render it too lengthy to be useful during the initial translocation years. These considerations also must extend to surrounding lands onto which tortoises might disperse.

These criteria are consistent with the goals, objectives, and recovery strategies of the Recovery Plan USFWS (2011a) and USFWS translocation guidance (USFWS 2011b). The latter further requires that:

- Disease prevalence within the resident desert tortoise population is less than 20 percent.

- Recipient sites should be within 40 km of the impact area, with no natural barriers to movement between them, to ensure that the desert tortoises at the two sites were likely part of a larger mixing population and similar genetically.
- Release sites must be at least 10 km from major unfenced roads or highways.
- Recipient areas include a dispersal radius of 6.5 km from release points.

MCAGCC will translocate more wild desert tortoises than any prior translocation. The magnitude of successfully translocating roughly 1500 tortoises not only elevates the recovery concerns, but elevates the logistical complexities in determining the locations, number and sizes of recipient sites and corresponding control sites. USFWS (2011b) recommends that post-translocation densities of adult tortoises not exceed one standard deviation (SD) of the most current density in the recovery unit. For MCAGCC, the mean Western Mojave Recovery Unit density is 2.8 adult tortoises/km² (USFWS 2015b), which translates to a post-translocation maximum of 3.7, an increase of 0.9 tortoises/km². Thus, translocating 998 adults (Table 1) would require 1108 km².

Beyond the basic criteria for recipient sites that will optimize translocation, there are additional considerations pertaining to monitoring and research, which are critical components for evaluating the success of the translocation program:

- Replicates, both among sites and individuals, are crucial for statistically examining translocation effects.
- Control sites must be similar to recipient sites, but not influenced by translocation to recipient sites. USFWS (2011b) recommends a separation distance of approximately 10 km (6.25 mi).
- Experimental sites must be sufficiently separated to avoid co-interference.
- The intensive tracking schedule required by USFWS (2011b, 2012) requires that individuals be found virtually weekly throughout the year, largely because translocatees travel erratically and unpredictably and can be lost easily. The tracking requirements for Year 1 are:

Within 24 h of release
Twice weekly for first two weeks
Weekly from March through early November
Twice monthly from November through February

Years 2-5 are only slightly less intense. Accordingly, access to transmitted individuals must be continuous. Because range access on the Combat Center is highly restricted due to training exercises, transmitted animals cannot be released on the Combat Center without considering alternative tracking schedules and other monitoring efforts.. For the Sunshine Peak portion of the Rodman-Sunshine Peak dispersal area, the Combat Center will implement a combination of occasional radiotracking combined with multiple line transects to span most of the Sunshine Peak Training Area (Section 4.1.1).

3.2 RECIPIENT AND CONTROL SITE SELECTION

Six recipient areas and seven control sites were designated (Figure 2). Recipient areas include both a release area and a dispersal area. Each recipient area is paired with a control site(s) to match genetics, habitat and local weather patterns.

Generally speaking, recipient areas meet the criteria listed in Section 3.1, above. None is more than 40 km from the impact areas (Table 2), although they are up to 53 km from the furthest edge of the relevant impact area. These distances are much less than the conservative 200 km recommended physical limit before incurring risk of outbreeding depression (Averill-Murray & Hagerty 2014).

Translocation to depleted populations is highly likely to occur for this project. Tortoise populations have declined severely throughout their geographic range (Karl 2004 and 2010, McLuckie et al. 2006, Boarman et al. 2008, USFWS 2011a, 2015b). In the MCAGCC area, specific tortoise declines have been documented on several sites:

- The Emerson Lake, Sand Hill and Bullion training ranges adjacent to the impact areas - Numbers of live tortoises at the Emerson Lake Plot declined from consistent levels of 15 to 20 tortoises/km² on three surveys between 1997 and 2003 to 3.0 tortoises/km² in 2009 (Kiva 2009). The Sand Hill permanent study plot (Plot #2) plot declined from 37.8 to 10.4 tortoises/km² between 1991 and 2008 (Kiva 2008) and to 3 tortoises/km² in 2013 (A.P. Woodman, unpubl. data). The Bullion plot had 31 and 42 tortoises/km² in 2001 and 2003, respectively (Kiva 2007, unpub. data) and 15 tortoises/km² in 2015 (clearance data).
- The BLM's Johnson Valley long-term study plot declined from 69 tortoises/km² in 1980 to 6 tortoises/km² in 1992 (Berry 1996 in BLM 2005).
- USFWS' line distance sampling program has recorded continuous declines in the Ord-Rodman sampling stratum, from 8.2 to 3.6 tortoises/km² between 2007 and 2015 (USFWS 2009b, 2015b).

By contrast, no regional increases in tortoise density near MCAGCC have been documented. Accordingly, the recipient sites for the MCAGCC translocation are all likely depleted. Whether they are below carrying capacity is unknown. The term "carrying capacity" has been used historically to characterize, both empirically and mathematically, the sustainability of a species in a given area or habitat. Exact definitions vary (Edwards and Fowle 1955, Dhondt 1988), but a reasonable working definition refers to the maximum population of a given species that can be supported in a defined habitat without permanently impairing the productivity of that habitat (Rees 1996).

Examining changes in habitat is a reasonable first approach to evaluating if a particular area may have a long-term higher carrying capacity than the current populations suggest. Because the topography, hydrology, and surface disturbance appear to be unchanged in the recipient areas, there is a reasonable likelihood that the carrying capacity can support more tortoises than are currently present. Declines may have little to do with the inherent carrying capacity of the abiotic and biotic features of the habitat, but more to do with

Table 2. Relationship of impact, recipient (R) and control (C) sites. Each recipient area is paired with one or more control sites. The natural and artificial features that separate the recipient and control sites from the impact areas and separate the paired sites are listed. Mountains that are impermeable to tortoises are considered to be barriers. Permeable but difficult terrain is considered a deterrent.

Site	Size (km ²) ¹	Separation from Impact Area		Paired Site			Number of Mark- Recapture Plots
		Distance from Impact Area (km) ²	Other Separation Factors	Paired Site	Distance from Paired Site (km) ³	Other Separation Factors	
Recipient				Control			
Rodman Sunshine Peak N	103.4	6.9	low mountains (a deterrent, not a barrier)	Rodman Sunshine Peak S	6.5	low mountains (a deterrent, not a barrier)	3
				Daggett	38	Newberry Mountains (barrier), residential development, poor (playa) habitat	
Lucerne-Ord	162.5	12.5	Fry Mountains (barrier)	Rodman Sunshine Peak S		Fry Mountains (low; a deterrent, not barrier)	1
				Daggett	23	Ord Mountains (barrier)	
Broadwell	52.4	28.5	broad lava flow (barrier), freeway, poor habitat	Calico	3.3	Cady Mountains (low; a deterrent, not a barrier)	
Siberia	63.8	27.8	Combat Center, several mountain ranges	Ludlow	5.8	low mountains (a deterrent, not a barrier)	1

Cleghorn Recipient	8.1	1	tortoise exclusion fence	Cleghorn Control	3.0	tortoise exclusion fence	1
Bullion (R)	52.7	9.9	tortoise exclusion fence	Bullion (C)	5.6	tortoise exclusion fence	1
Control				Recipient			
Rodman Sunshine Peak S	54	0.5	tortoise exclusion fence	Rodman Sunshine Peak N, Lucerne-Ord	---	---	1
Daggett	22	31.6	Rodman and Newberry Mountains (barrier)	Rodman Sunshine Peak N, Lucerne-Ord	---	---	1
Calico	16.7	23.3	broad lava flow (barrier), freeway, poor habitat	Broadwell	---	---	
Ludlow	11	27.9	Combat Center, several mountain ranges	Siberia	---	---	1
Cleghorn (C)	9.5	1.7	No barrier, although localized topographic features (incised washes, low hills) on control site probably encourage tortoises to remain locally	Cleghorn (R)	---	---	1
Bullion (C)	12	15.7	Bullion Mountains (barrier)	Bullion (R)	---	---	1

1. For Recipient sites, this is the size of the release and dispersal area (=recipient area). For control sites, it is the approximate study area size.

2. Distance is from nearest edge of the impact area.

3. Distance is from edge of the release area

extrinsic factors (e.g., predation, disease, drought). Hence, augmenting the recipient areas' populations may bolster the populations' ability to withstand stochastic events or chronic and/or gradual impacts.

3.3 DESCRIPTIONS OF THE RECIPIENT AND CONTROL SITES

Specific characteristics of each recipient site, and issues related to translocation, are discussed below. Control sites have been included to demonstrate that they have essentially the same conditions as the paired recipient sites, and have adequate conditions to support a long-term study (e.g., conservation areas). Land uses and long-term protection² are detailed in Table 3 and Figures 2 and 3. We evaluated specific mortality factors at each site (Table 4, Figures 4 and 5) that included disease and predation. Because many of these data were collected this fall, the analysis has not been completed; accordingly, the results we present here are preliminary. Using data on the shells found during tortoise searches, we assessed mortality rates for the last four years for adult tortoises (≥ 180 mm in carapace length [MCL]). Enzyme-Linked ImmunoSorbent Assay (ELISA) results provided disease status for *Mycoplasma agassizii* and *M. testudineum*. We evaluated trauma from canids (coyotes and dogs) based on trauma data gathered during health assessments. Raven risk was derived from raven point counts and nest surveys begun in Spring 2015. None of the sites is perfect for translocation due to the many constraints, but they are the best feasible sites.

² BLM manages Areas of Critical Environmental Concern (ACEC's), National Landscape Conservation System (NCLS) lands, Wilderness Areas and Wilderness Study Areas (WSAs)

- o ACECs were established to "protect and prevent irreparable damage to important historic, cultural and scenic values; fish, wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. ...the management of ACECs is focused on the resource or natural hazard of concern ... and in some cases may involve surface disturbing actions" (BLM no date).
- o Desert Wildlife Management Areas (DWMAs) were identified in the original and revised recovery plans (USFWS 1994a and 2011a); they are managed as ACECs by BLM. DWMAs act as reserves in which recovery actions are implemented.
- o NCLS lands comprise a collective system of conservation lands that are managed "to ensure their conservation, protection, and, if needed, restoration for the long-term benefit of surrounding communities" (BLM 2015).
- o Wilderness Areas are to be managed "to retain their primeval character and influence, without permanent improvements or human habitation... (and are to be)...protected and managed so as to preserve...natural conditions" (BLM 1995). Wilderness Study Areas are managed to preserve wilderness characteristics until Congress makes a final determination on the management of WSAs.

USFWS is responsible for Critical Habitat (CH) and for the development of Tortoise Conservation Areas (TCAs)

- o CH, designated for *G. agassizii* in 1994 by USFWS (1994b), provides legal protection for key areas for recovery where conservation actions can be focused.
- o TCAs are focus areas within existing desert tortoise conservation areas where aggressive management is recommended to ensure that populations remain distributed throughout the species range (USFWS, no date).

MCAGCC has established Special Use Areas (SUAs) on MCAGCC that are off limits to military training and vehicle travel off of Main Supply Routes (MSRs), with limited exceptions for Conservation Law Enforcement Officers (CLEOs), authorized NREA staff, and water and maintenance crews.

Table 3. Characteristics of recipient and control areas that are related to site choice. Recipient areas include release plus dispersal areas; control sites are the approximate areas within which tortoises were sought or studied. Conservation areas include existing areas and new areas proposed by the DRECP, Feinstein Bill, and Cook Bill. The Cook Bill resembles the Feinstein Bill in most areas relevant to the MCAGCC translocation and is incorporated by reference except where it diverges. See text for explanation of conservation areas.

Site	Associated Conservation Areas ¹	Land Uses
Recipient Areas		
Lucerne-Ord	Substantially overlaps: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Ord-Rodman Tortoise Conservation Area	Large transmission line corridor Limited Use OHV designation but possible proliferation anticipated Overlaps Ord Mountain grazing allotment Mixture of federal and private lands Scattered occupied residents >6.6 km south of the release area
Rodman Sunshine Peak North	Substantially overlaps: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Sunshine Peak Training Area Ord-Rodman Tortoise Conservation Area Bordered by Rodman Mountains Wilderness	Large transmission line corridor No projected future use of area ³ Overlaps Ord Mountain grazing allotment ~3 km ² All lands federally owned
Siberia	In: Proposed Mojave Trails National Monument (Feinstein Bill) Proposed ACEC (DRECP) Overlaps: Proposed National Landscape Conservation System (DRECP) Borders MCAGCC	Negligible recreation use, although gas pipelines provide ingress routes No projected use of area ³ but large block of private lands in west - former proposed solar energy project Mixture of federal, state and private lands
Broadwell	Substantially overlaps: Cady Mountains Wilderness Study Area Proposed National Landscape Conservation System (DRECP) Proposed ACEC (DRECP) Proposed Mojave Trails National Monument (Feinstein Bill) Near Kelso Dunes Wilderness	Retired grazing allotment Negligible recreation use No projected future use of area ² Large transmission line corridor Nearly all lands federally owned
Cleghorn Recipient	Entirely on MCAGCC- Cleghorn Lakes RTA SUA Adjacent to Cleghorn Wilderness	Scattered occupied houses with dogs, 6.7 km south
Bullion Recipient	Entirely on MCAGCC - Bullion RTA SUA	Training will occur in the recipient area outside the SUA

Control Areas		
Rodman Sunshine Peak South	On MCAGCC SUA Substantially overlaps: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Sunshine Peak Training Area Ord-Rodman Tortoise Conservation Area Bordered by Rodman Mountains Wilderness	Large transmission line corridor Residual Open OHV Area to north (will be fenced with tortoise exclusion fencing) Proposed expanded Open OHV Area to west (Cook Bill) Overlaps Ord Mountain grazing allotment All lands federally owned
Daggett	In: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Abuts Rodman Mountains Wilderness	Large transmission line corridor Mixture of federal and private land No projected future use of area ³ ≥1.3 kms south of I-40 and Daggett
Ludlow	In: Proposed Mojave Trails National Monument (Feinstein Bill) Proposed ACEC (DRECP) Overlaps: Proposed National Landscape Conservation System (DRECP) Near MCAGCC	Negligible recreation use, although gas pipelines provide ingress routes Mixture of federal and state lands
Calico	Substantially overlaps: Proposed National Landscape Conservation System (DRECP) Proposed ACEC (DRECP) Abuts Proposed Mojave Trails National Monument (Feinstein Bill) Cady Mountains Wilderness Study Area	Retired grazing allotment Negligible recreation use No projected future use of area ² Large transmission line corridor Mostly federal land ownership
Cleghorn Control	Entirely on MCAGCC- Cleghorn Lakes Training Area SUA Adjacent to Cleghorn Wilderness	Scattered occupied houses with dogs, 5.5 km southeast
Bullion (C)	Entirely in Cleghorn Wilderness Borders MCAGCC	

1. Sources: *West Mojave Plan* (BLM 2005), *DRECP* (CEC et al 2014), *Feinstein Bill* (Feinstein 2015), *Cook Bill* (Cook 2015)

2. C. Otahol (2015a)

3. C. Otahol (2015b)

Table 4. Mortality factors at the translocation and impact areas. Incidence of disease (positive (P) or suspect (S)), canid trauma and mortality rates include substantial data collected in Fall 2015 that are not yet fully analyzed. Disease data are from Fall 2014 and 2015 unless noted. Canid trauma ranks follow trauma scoring in Berry and Christopher (2001): mild (2); moderate (3); and severe (4). Cumulative ranks are a combined ranking of canid-related trauma for gulars, flares, and limbs. Raven survey information is incomplete because surveys were expanded after the nesting season in 2015 to accommodate several new sites. "Offending raven" nests have juvenile tortoise remains beneath (USFWS 2008). N.A.=Not Available

Site	Incidence of Disease ¹						Canid Trauma					Ravens Nests/ "Offending Raven" Nests
	<i>M. agassizii</i>		<i>M. testudineum</i>		Total Analyzed	% of Total That Are Seropositive	Rankings			% of Total with Rank 3 or 4		
	P	S	P	S			2	3	4		Total analyzed	
Impact												
WEA	18	77	8	21	1056	2.5	NA					NA
SEA	0	4	0	0	89	0	NA					NA
Recipient (R)												
Rodman Sunshine Peak N (2014) ² Lucerne-Ord Broadwell Siberia Cleghorn (R) Bullion (R) (2013)												11/ 2
	0	2	0	0	24	0	32	24	12	121	29.8	
	0	1	0	1	16	0	4	1	1	17	11.8	
	3	1	6	16	100	8.0	19	23	16	102	38.2	8/1
	NA											
	3	2	0	3	25	12.0	6	6	1	27	25.9	NA
	0	3	0	1	40	0.0	10	8	3	41	26.8	NA
	0	0	0	0	21	0	6	5	8	19	30.8	NA
	0	0	0	0	13	0	4	3	1	13	30.8	NA
	1	0	0	3	22 ³	4.5	NA					
Control (C)												
Rodman Sunshine Peak S	1	9	0	0	22	4.5	NA					1 / 0
Daggett	7	5	3	0	53	18.9	33	24	16	100	40.0	9 / 0
	NA						11	3	2	37	13.5	NA
Calico	2	1	0	1	26	7.7	8	5	1	27	22.2	NA
Ludlow	9	0	0	2	37	0.0	11	3	2	37	13.5	NA
Cleghorn (C)	1	2	0	0	17	2.6 (Cleghorn R+ C)	8	3	5	18	40.0	NA
Bullion (C)	0	0	0	0	10	0	4	1	1	10	20	NA

1. Results as of 1 Nov 15. Total is number of samples analyzed to date. Percent of total is for tortoises that are seropositive for one or both species of *Mycoplasma*.

2. Source: P. Woodman, unpub. data

3. Source: Kiva (2013)

3.3.1 RECIPIENT AREAS

Lucerne Ord

This site is a broad area of mixed fair to good quality habitats. It lies in a large bowl with natural topographic barriers (Ord Mountains) to the west and north. There are no highways or heavily used roads. While it receives substantial protection from future development via its overlap with multiple conservation areas (Table 3, Figure 3a), the edges of the dispersal area about the Johnson Valley Open Off Highway Vehicle (OHV) Area. Although the recipient area is BLM-designated for Limited Use (i.e., travel on existing routes only), OHV use is moderate to high near low mountains and along some roads. OHV proliferation may occur due to loss of parts of the Johnson Valley Open OHV area for the MCAGCC expansion. The MCAGCC expansion Environmental Impact Statement (EIS; Navy 2011b) concluded that the Ord Mountain route network would be expected to see a pronounced increase in OHV activity as a result of displaced use from Johnson Valley, due to the area's popularity and spillover from Stoddard Valley (TEC 2011). However, the study cautioned that data on reliable projections of increased OHV activity and locations were unavailable and that "projecting increases in OHV use with any certainty, by specific location with the ODA [Open Desert Area], was described by OHV enforcement experts as a near impossibility – there are too many factors, which change dynamically before they can be studied, to establish a reliable projection."

The southern edge of the Ord Mountain grazing allotment intersects the northern roughly third of the recipient area (47 km² of overlap). This allotment has a long history of cattle grazing and an allowable limit of 302 cattle (3632 Animal Unit Months [AUMs]) (BLM 2006), although only approximately 30 or fewer cows have been grazed for the last few years (A. Chavez, 2015). Per stipulations in the West Mojave Plan (WMP; BLM 2005), cattle grazing is to be excluded during spring and fall throughout this overlap area in years when biomass production of ephemeral vegetation is below 230 lb/acre (BLM 2006). There are no water sources for cattle in Lucerne Valley (BLM 2006).

The transmission line subsidizes nesting for ravens, and eight active raven nests within 6.5 km of the recipient area were present on the power poles in Spring 2015 (Table 4). One was an "offending raven" nest, under which hatchling tortoise remains were observed. Late spring and summer point counts in 2015 suggested relatively low raven density, generally none, but up to 2 ravens per 10 km² (Figure 4). But, during other surveys in September, flocks of dozens of ravens were seen daily flying through the valley.

Domestic dogs were responsible for mauling and killing tortoises in the southern portion of the recipient area in previous years (Jones 2002). However, many of the houses in Lucerne Valley are now abandoned; the nearest occupied house is 6.6 km south of the release site. Elevated canid trauma (Ranks 3 and 4) was evident in 38.2 % of the 102 tortoises (Table 4), but all trauma was healed. This may suggest that dogs are no longer roaming the area.

Despite these potential or realized threats, mortality is not unusually high compared to other sites. Preliminary estimates suggest annual mortality rates of fewer than 0.5 adult tortoises per km² in the last four years. While not as high as Rodman-Sunshine Peak North or Daggett Control, this is still high compared to the 2% suggested by Turner and Berry (1984) as “normal” for a sustainable population. This consistently high mortality rate throughout the study sites is very possibly the result of the multi-year drought in this region. Forage production in this area was negligible in 2012, 2013, and 2015 (A. Karl, field notes). Drought has been implicated in documented mortality episodes (Peterson 1994, Longshore et al. 2003, Karl 2004, Lovich et al. 2014).

Rodman-Sunshine Peak North

This site is a broad bajada of mixed fair, medium and moderately good habitat. A broad, lava flow provides an impermeable barrier to tortoise movement toward Interstate-40 (I-40). No future development is anticipated, and with the exception of a transmission corridor with three high-voltage transmission lines, and a distribution line, there is little current disturbance. All of the lands are federally-owned (San Bernardino County 2015). This site is relatively protected by its large overlap with conservation areas and Sunshine Peak Range Training Area (RTA), and adjacency to the Rodman Wilderness (Figure 3b). Sunshine Peak receives extremely little disturbance. It is a “hung ordnance” area, where aircraft try to dislodge ordnance that fail to launch during training exercises. Ground activity, primarily by the Combat Center’s Explosive Ordnance Division (EOD), is limited to a few days per year, when EOD detonates or removes ordnance.

This site was configured to avoid dispersal into Wilderness, per BLM (Symons 2015), and provide at least a 6.5 km distance from the MEB northern battalion route. Because of the constraint to avoid Wilderness, most tortoises will have to be translocated to the Sunshine Peak RTA. To avoid translocation and tracking constraints due to limited access to the Sunshine Peak RTA, the Combat Center will implement a monitoring effort that varies from the other sites (Section 4.1.1, Tracking).. Despite these challenges, this remains a valuable recipient site due to its land use protections, and the proposed monitoring will provide useful information.

Mortality rates and factors are still being analyzed, but preliminary results suggest relatively high annual mortality rates of roughly 2 adult tortoises per km² for the last four years. The other recipient and control sites had annual mortalities below 0.7 over the same time period, except the Daggett Control site (see below). Infection by *M. agassizii* and *M. testudineum* appears to be very low; none of the 24 samples analyzed to date were positive for either pathogen and only two were suspect (Table 4). These results are virtually identical to those for 2014 (A.P. Woodman, unpub. data) in the same area. We are awaiting the lab results on the remaining samples from this site.

Nearly 30% of live tortoises exhibited elevated levels of trauma from canids (Ranks 3 and 4) at this site; 12 of 68 had fresh trauma. Trauma was largely confined to the furthest west areas closer to the freeway rest area and the Newberry Springs residences, mostly beyond the dispersal area (Figure 5b). The transmission line subsidizes nesting for

ravens, and 11 raven nests within 6.5 km of the recipient area were present on the power poles in Spring 2015 (Table 4). One was an “offending raven” nest, under which hatchling tortoise remains were observed. A second offending raven nest was inactive. Otherwise, ravens were observed at the site in generally low numbers (Figure 4).

Many of the shells were intact, suggesting that most tortoises died of causes other than predation. Given the relatively localized canid trauma and the apparent lack of Mycoplasmosis, a regional factor such as drought is a more likely the cause of the elevated mortality. In addition, a flood event in late Summer 2014 likely buried many tortoises. High mortality on this site would support the interpretation of a depleted population.

Siberia

The Siberia recipient area lies on a narrow, steep alluvial fan out of the Bullion Mountains. There is no current use of the site that would negatively impact tortoises (Table 3), but it was formerly the site of a proposed solar plant (“Siberia”). A large block of private lands in the west leaves open the possibility of future development, although this area is no longer in a solar energy development zone (CEC et al. 2014). Currently, the area is proposed for conservation in the Desert Renewable Energy Conservation Plan (DRECP; California Energy Commission et al 2014), the California Desert Conservation and Recreation Act ("Feinstein Bill"; Feinstein 2015), and California Minerals, Off-Road Recreation and Conservation Act ("Cook Bill"; Cook 2015).

The release area here was constrained by three major factors: (a) proximity to MCAGCC; (b) distance to State Route 66 (SR 66); and (c) poor habitat in the center of the site. Without fencing, there are no barriers preventing tortoises from travelling onto MCAGCC. However, the USMC has agreed to fence the border with tortoise exclusion fencing to solve this problem. SR 66 is 6.5 km east at the nearest point. While this old highway is not heavily travelled, tortoise mortality is possible. Finally, most of the center of the fan is very poor habitat. The heavy monsoon during late Summer 2014 scoured the large wash system in the center of the fan, and little soil remains. Few tortoises remain in this scoured wash as well. During solar site surveys in 2012, 24 tortoises were found in this wash (URS 2014); during 2015 searches, only a single tortoise was found.

Preliminary analyses suggest annual mortality rates of roughly 0.7 adult tortoises per km² in the last four years; this is consistent with most of the other recipient and control sites and may reflect both the drought and the flood. Canid trauma was moderate, and consistent with most of the sites; 26.8% of the tortoises had elevated levels of trauma (Table 4). None of the canid trauma was fresh.

Broadwell

This site lies on a large, steeply sloping bajada bordered by low to tall mountains. Much of the bajada has only moderate utility to tortoises because of the densely cobbly and gravelly substrates; the low species richness and plant volume is an indicator of this

lower quality habitat. Not surprisingly, tortoises were disproportionately found in the incised washes of the upper bajada near the mountain toeslopes; these also had a high component of caliche cavities that are favored as burrows by tortoises.

The site achieves moderately high protection from overlapping and nearby existing and proposed conservation lands (Table 3, Figure 3d) and nearly all of the lands are federally owned. There is little current use of the area with the exception of a transmission corridor with two high-voltage transmission lines, and future development is not anticipated. The transmission line provides raven nesting subsidies, but has not been studied, so the degree of raven use of the area is unknown.

Preliminary analyses suggest annual mortality rates of fewer than 0.3 adult tortoises per km² in the last four years, consistent with most of the other recipient and control sites. Broadwell has a higher disease prevalence relative to *Mycoplasma* than some of the other sites – 12% of the tortoises sampled (n=25) were positive for *M. agassizii* (Table 4). Canid trauma was moderate, and consistent with most of the sites; 25.9% of the tortoises had elevated levels of trauma (Table 4). None of the canid trauma was fresh.

Cleghorn Recipient and Control

These sites are discussed together because they are only three kilometers apart, but separated by a tortoise exclusion fence. The recipient site will be completely fenced with tortoise exclusion fence and studied as a constrained dispersal site (Figure 3e; also see Section 4.2.3 below). After two years, the constraining fence on the east will be removed (the fence between the constrained dispersal area and SEA impact area will remain in perpetuity). A mark-recapture plot was established outside the current constrained dispersal area, and will be used as an additional control site until tortoises are released from the constrained dispersal pen.

Both the control and recipient sites are in undeveloped native habitat. They are on MCAGCC (the recipient site is in a Special Use Area [SUA]) and adjacent to Cleghorn Wilderness, so are protected from public use or development. Disease incidence relative to *Mycoplasma* is low. Only one in 38 tortoises was positive or suspect for *Mycoplasma* spp. in 2015 (Table 4). This is consistent with earlier surveys in 2010 in Cleghorn Pass RTA adjacent to the SEA – of six tortoises, none was positive and two were suspect (J. Smith 2011, unpub. NREA data).

While preliminary mortality rates are not higher than other sites (0.5 adult tortoises per km² per year in the last four years), canid trauma is the highest of any site. For the combined sites, 59.5% of the tortoises had elevated levels of trauma (Table 4). None of the trauma was fresh and there was no clear distributional pattern that would suggest that dogs from the houses in Wonder Valley to the south were preying on tortoises (Figure 5e). Most of the trauma occurs within 6 km of the houses, but some is well north, near the mountains. There may well be two sources of canid trauma, domestic dogs and coyotes. Assuming that dog trauma is occurring (dogs could be heard during our surveys), we moved the constrained dispersal site beyond 6.5 km from the houses.

Further, we plan to implement an information outreach program to encourage people to confine their dogs. We will also conduct a study to monitor dog and coyote presence, install deterrents for the constrained dispersal pen (e.g., hot wire), and implement a canid control program.

Bullion Recipient and Control

The major site constraint is the limited access for monitoring. Access to both sites is through the Bullion RTA and the sites are both remote, requiring substantial time to get there, and access may be limited by the schedule of training activities. Consequently, the tracking schedule in the BO (USFWS 2012) may prove infeasible.

These sites have good habitat quality and receive high protection from public activities or development. Bullion Control is in the Cleghorn Wilderness and far from any human impacts. Bullion Recipient is in the Bullion RTA but largely in the SUA. Future threats appear to be limited to training activities, outside the SUA. Raven surveys have not been performed and mortality rates and trauma due to canids are under analysis, but disease levels are low. Of 23 tortoises sampled in 2015, none was seropositive or suspect for *Mycoplasma*. Historically, no tortoises had signs of respiratory disease or were seropositive for *Mycoplasma* on the Bullion demographic plot in 2001, 2002, 2003, or 2008 (Kiva 2008). In 2013, one tortoise tested seropositive for *M. agassizii* and three were suspect for *M. testudineum* (Kiva 2013).

3.3.2 OTHER CONTROL SITES

Rodman-Sunshine Peak South

This control area is in an SUA adjacent to the WEA. It comprises a substantial area of moderately good and good habitat that is relatively protected by its large overlap with conservation areas and the SUA, and proximity to the Rodman Mountains Wilderness (Figure 3b). The main issue with the site is the tortoise exclusion fences. Tortoises will be separated from the training exercises by a tortoise-proof fence, but with tortoises fenced in on three sides, this does not represent a perfect, unmanipulated site.

Future OHV impacts are questionable. A small triangle (~12 km²) of Johnson Valley Open OHV remains north of the SUA (Figure 3b). At this time, the only access to this triangle is the transmission line maintenance road, so it is uncertain whether this area would be visited by recreationists. This could change, however, if the Cook Bill (Cook 2015) creates a broader connection between this isolated triangle and the main Open OHV area (Figure 3b).

Mortality factors (e.g., rates, canid predation) are not yet known. The transmission line subsidizes nesting for ravens but only one active raven nest was observed within 6.5 km (Table 4). Only one tortoise of the 22 sampled is seropositive for *M. agassizii*. We will complete surveys to find and transmitter additional control tortoises in early Spring 2016.

Daggett

This site was chosen because of its higher quality habitat over a relatively broad area and its separation from, but proximity to, the Rodman-Sunshine Peak North and Lucerne-Ord recipient sites. While a mixture of public and private lands, its location within conservation lands provide impediments to further development (Table 3, Figure 3g); BLM is not aware of any proposals for development (Otahol 2015b).

Preliminary mortality analyses suggest that annual mortality is relatively high, roughly 1.8 adult tortoises per km² for the last four years. This site is subject to the same regional drought-related pressures discussed earlier. Predator pressure is also high. Of 100 tortoises sampled, 40% have elevated levels of canid-related trauma (Table 4); 11 of 73 tortoises had unhealed injuries. There was no direct evidence of dogs (dogs or scat) during the surveys in Fall 2015 or pattern of trauma nearer the houses that would suggest domestic dogs (Figure 5f). Also, it seems unlikely that dogs would traverse the freeway from the towns of Daggett or Yermo to prey on tortoises; there is only one occupied house on the south side of the freeway and we don't know if dogs live there. Coyotes that are attracted to the residential and agricultural development at Daggett may be the canid predator at the Daggett control site. Further monitoring may provide answers.

The transmission line subsidizes nesting for ravens. Nine active raven nests were observed within 6.5 km (Table 4). Raven presence from May through July was relatively low, 0.5 ravens per 10 km² during point count surveys (Figure 4). However, agriculture, residential development, and the freeway provide several local food subsidies. Raven populations are likely to be moderately high in the area, with concomitant high predation on juvenile tortoises.

The presence of *Mycoplasma* infections is unusually high compared to other sites (Table 4), with 18.9% of the 53 tortoises analyzed to date are positive for *M. agassizii* and/or *M. testudineum*.

Ludlow

This site comprises fair to moderately good habitat, and is very similar to occupied areas of the paired Siberia site. It is relatively undisturbed by human activities; only a pipeline currently provides access, and use by the public appears negligible. Preliminary estimates of mortality suggest an annual rate of 0.7 adult tortoises per km² for the last four years, relatively consistent with most other recipient and control sites. Canid trauma was the lowest observed at any site – 13.5% (Table 4). Incidence of disease is not yet available.

Calico

This paired site to the Broadwell Recipient Site lies on a small south-facing bajada against the foothills of the Cady Mountains. It is relatively undisturbed by human activities and the former grazing allotment has been retired. It is marginally protected from development, based on current and proposed conservation designations (Table 3,

Figure 3d). Impacts are similar to the Broadwell site. Infection by *Mycoplasma* spp. occurs in 7.7% of the tortoises tested (Table 4), which is slightly higher than most other recipient and control sites, but more similar to Broadwell (12%). Canid trauma was moderate, and consistent with most of the sites; 22.2% of the tortoises had elevated levels of trauma (Table 4) but none was fresh.

3.4 RECIPIENT SITE PREPARATION

3.4.1 TORTOISE EXCLUSION FENCING

Permanent tortoise exclusion fencing will be installed:

- Between impact areas and recipient areas and/or SUAs, to keep tortoises from entering the impact areas (Figures 3b and 3e);
- Between recipient areas and the Open OHV Area north of the WEA (Figure 3b); and
- Along the Combat Center border at the Siberia site, to keep transmittered tortoises from crossing into the Combat Center (Figure 3c).

Temporary tortoise exclusion fencing will be installed at two locations to keep tortoises from dispersing into the Cleghorn Wilderness:

- The constrained dispersal plot in Cleghorn Lakes RTA (Figure 3e); and
- The southern portion of the Bullion RTA (Figure 3f).

Materials and Design

Exclusion fence materials and design will comply with USFWS (2009a) specifications. For temporary fencing, rebar or other sufficiently sturdy posts may replace t-stakes. In all cases, supporting stakes will be spaced sufficiently to maintain fence integrity. Tortoise-proof grates (“cattle guards”) will be installed at entry points where unimpeded vehicle traffic is necessary.

Surveys and Monitoring during Fence Construction

Within 24 hours prior to fence installation, biologists will survey the staked fenceline for tortoises and for all burrows that could be used by tortoises. Surveys will include 100% of all areas to be disturbed by fencing and a swath of at least 90 ft centered on the fenceline, using 5 m-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the burrow size and occupancy recorded. If not occupied, indications of how recently the burrow was used will be recorded. Occupancy will be determined by a combined use of reflective mirrors, probing, tapping the entrance, listening, and/or scoping with a fiberoptics scope. In all cases, occupancy will be verified only if all interior edges of the burrow can be felt, such that a “hidden” chamber at the end is not missed. Any tools used inside a burrow will be disinfected before use in another burrow, using the most recent disease prevention techniques (e.g., USFWS

2015a). Burrows may be flagged, if it will not attract poaching. Flagging also may attract predators, but can be placed at a standardized distance and direction from burrows.

All burrows will be visually and tactilely examined for occupancy by tortoises and other wildlife. If occupancy is negative or cannot be established, the burrow will be carefully excavated with hand tools, using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994), including disinfection techniques for all tools.

The fencing will be shifted to avoid all burrows over 0.5 meters in length and all active burrows, with the fence placed between the avoided burrows and future intensive training. Fence construction may occur during any time of the year (USFWS 2011b). All fence construction will be monitored by approved biological monitors (BMs) to ensure that no desert tortoises are harmed. The level of monitoring will depend on the specific fencing activity, but at least one tortoise monitor will accompany each separate construction team, such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a monitor. Maps of burrows from the pre-construction survey will be provided to all BMs to assist in protecting tortoises. Such maps may also be useful for relocating tortoises.

All exclusion fencing will be inspected monthly and immediately after all rainfall events where soil and water flow could damage the fence or erode the soil underneath. Any damage to any fencing, either permanent or temporary, will be repaired immediately. If exclusion fencing is installed when tortoises are known to be active, either from spring through fall or in winter during unusually warm weather, then all installed exclusion fence (partial or complete) will be checked 2-3 times daily for two weeks to ensure that no tortoise is fence-walking to the point of exhaustion or overexposure. If midday temperatures are above thresholds at which tortoises must go underground to escape heat (approximately 43°C ground temperature), then one of the fence checks should occur one hour prior to this threshold being reached. This same process will occur for the first 2-3 weeks of the activity season if the fence is installed in winter, when tortoises are underground.

Tortoise Disposition during Fence Construction

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching is typically completed by October (BT Henen and AE Karl, unpub. obs.). In the event that nests are found between April 15 and October 31, the nests will be moved. Eggs will be inspected to determine if they are viable and, if so, will be moved to a similar microsite (e.g., cover, plant species, soil type, substrate, aspect) on the recipient sites using standard techniques (e.g. Desert Tortoise Council 1994, USFWS 2009b).

Translocated nests may be fenced with open-mesh fencing (e.g. 3-5 cm wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted by human scent to the new nests. Alternatively, smaller mesh fencing or other techniques may be used to prevent ground squirrel predation on nests. Open-mesh fencing or avian netting also will be installed on the roof of the nest enclosure to prevent predator entry. Nests will be monitored from a 30-foot distance once a month until late November, at

which time they will be excavated for examination. If possible, hatchlings will be weighed, measured, photographed, described, and marked.

3.4.2 PREDATOR MONITORING AND CONTROL

Predator monitoring is a crucial part of the translocation program. We will continue with the current raven point counts and nest surveys, expanding them to the remaining (more recently designated) translocation areas. The main purpose will be to identify ravens that are killing tortoise and, secondarily, to examine predation pressure. Where appropriate, USDA Wildlife Services will be notified to dispatch offending ravens.

Canid predation is occurring on all sites (Figures 5a to 5g) and in the impact areas. Beyond that, our knowledge is limited to understanding that coyotes are present naturally, are undoubtedly subsidized by humans, and that free-roaming dogs chew on tortoises. There is much that we do not understand that would help us evaluate the canid predation on tortoises and try to devise feasible solutions. For instance:

- Near some human interfaces, we do not know if domestic dogs or coyotes, or both, are chewing on tortoises.
- What is the abundance of canid populations and their use patterns?
- What are the factors that drive local population cycles?
- What factors attract canids to tortoises and what are the modifiers?
- What deterrents or other control methods are possible and practical?

We are currently developing a program to answer the first two questions. This will likely include transects for sign, and monitoring by camera, at a minimum.

In the interim, we will attempt to decrease the vulnerability of translocated tortoises, which spend more time aboveground early in the translocation and may choose poorer coversites. At the constrained dispersal site, we will implement Conservation Law Enforcement Officer (CLEO) monitoring, and a canid control program. A standard livestock “hot” wire, lightly electrified to deter passage, may be installed above the constraining fence. NREA also will implement a neighborhood outreach program to notify border residents that free-roaming dogs are not permitted on MCAGCC. Dogs that enter the constrained dispersal area may be controlled.

Coyote control may be implemented elsewhere in the translocation areas. While coyotes are native, their populations are enhanced by human activities (Esque et al. 2010). Coyote populations are unlikely to be harmed by removal of some animals. By contrast, tortoise populations are already strongly diminished and the species is imperiled. The intent of the MCAGCC translocation is to augment tortoise populations and improve recovery possibilities, not subsidize coyotes in the form of translocated tortoises. Accordingly, coyotes may be controlled in the translocation areas.

3.5 DISPOSITION CRITERIA

Three questions must be answered to determine where individual tortoises will be translocated:

1. How many tortoises go to each site?
2. Which individuals will go to which site?
3. Of the group in #2, which tortoises will keep transmitters (only 225 of the existing 1138)?

The answer to the first question is based on experimental augmentation densities as explained in Section 4.2.1, below (also see Table 6). The second and third are subject to a number of criteria, including, but not limited to:

- Demography – maintaining capture area sex ratios and population size structure.
- Social groups – Male tortoises are known to be familiar and mate with specific females in their area. While social “groups” may be difficult to determine without extensive observation or genetic paternity testing, geography may serve as a logical surrogate for moving groups of tortoises together.
- Habitat types – While tortoises are highly opportunistic and may thrive in new habitats, tortoises accustomed to living in certain topographies (e.g., rocky slopes; incised washes; gentle bajadas with deep, friable soil) may adjust more readily to a new location if the habitat is similar to that at the capture location. The Combat Center will generally move tortoises to new locations with topographies similar to their home sites. However, to limit the distance from impact area to recipient site, some tortoises from different topographies in the WEA will be moved to Lucerne-Ord, where they may spread to nearby topographies most similar to their home sites.
- Disease Levels – Epidemiological considerations related to seropositive, suspect, or clinically ill tortoises will be evaluated to minimize the spread of *Mycoplasma* spp. Some tortoises in the impact area may not be suitable candidates for translocation because of a moderate to severe nasal discharge, oral plaques, or other conditions that may compromise survival (USFWS 2015a). While there are no tortoises in the WEA or SEA that are known to currently meet these latter criteria, conditions could change.

Disposition plans for every tortoise (or groups) are currently under development and will be submitted to USFWS for approval in ample time for review.

4.0 MONITORING AND RESEARCH

Choice of recipient sites is critical towards a better chance for translocation success, but we will know how well we succeed through carefully defining and evaluating variables to monitor. The overarching goal is to minimize losses and maximize assimilation into the existing population. Monitoring and research are essential to quantify how well the translocation addresses this goal. This translocation provides numerous opportunities to

answer research questions that increase our understanding of the species and translocation, and advance population management and species recovery. However, we prioritize a successful translocation above research.

4.1 SURVIVAL AND ASSIMILATION

4.1.1 SURVIVAL

Survival will be examined primarily from tracking observations of radiotelemetered animals (Table 5). However, the survivorship or mortality of marked tortoises will also be analyzed from mark-recapture surveys, health assessment records, and transect surveys. The combination of health assessments (general observations and specific USFWS health assessments) and habitat analyses are planned to help interpret the factors affecting survivorship, assimilation, and abundance. Each technique is described below with a discussion of the data analyses.

Tracking

Survival will be assessed via tracking 675 telemetered tortoises, 225 each of translocated, control, and resident groups, with 225 representing approximately 20% (190 tortoises) of the adults, and 5% (35 tortoises) of the juveniles originally anticipated to be translocated (Table 1, USFWS 2012). Translocated, resident, and control tortoises will be tracked the first year according to the schedule in the *Guidance* USFWS (2011b; see Section 3.1, above). We anticipate that translocated tortoises will settle somewhat into newer home ranges after one year (Nussear 2004, Karl and Resource Design Technology 2007, Field et al. 2007), at which time we will track them less frequently: weekly during high activity periods - April, May, October and the last half of September; every two weeks from June through the first half of September; and monthly during November through February (~26 locations per tortoise per year).

After five years, the transmitted group will be decreased to 150 tortoises (50 per group) and monitored via tracking for five more years, using the decreased tracking schedule above. Then we will remove these transmitters unless MCAGCC and the resource agencies determine that additional monitoring would be productive.

During tracking, for every live, numbered tortoise observed, we will record location (UTM), behavior (e.g., foraging, mating, fighting, other tortoise interactions, walking), position (sheltered in shade, above-ground, or burrowed), burrow attributes (length, type, distance of tortoise in burrow), and health, if possible. We will photograph any dead, numbered tortoise and record data on time since death, cause of death and rationale, and percent of shell remaining. Trackers will note unusual raven or coyote activity, illegal or elevated legal OHV activity, or other unexpected or intense potential risks to tortoises.

We will analyze survivorship of the translocated and resident tortoises compared to control tortoises, with most data gathered during the first active season (release until brumation), each of the first five years (675 transmitted tortoises), and for years six to

ten (n=150 transmitters). We will use Kaplan-Meier methods to evaluate survivorship for and among groups (controls, residents and translocatees), and comparisons among periods (e.g., months, seasons, years and extended periods), sites, sexes, sizes, age classes, health status (e.g., *Mycoplasma* test results and Body Condition Scores), and other independent variables (e.g., habitat type and levels of ground disturbance or predator sign). Kaplan-Meier curves may be compared with log rank tests or hazard ratios (Rich et al. 2010). We may also compare survivorship among groups and independent variables using contingency table analyses (e.g., Zar 1999 & Field et al. 2007). We will consider AIC_c – based model selection to evaluate models including group, site, sex, and other variables (e.g., Nussle et al. 2012).

Rodman-Sunshine Peak North - We propose a combination of radiotracking, mark-recapture plots (see methods below), and transect surveys of tortoise density (USFWS 2010; see Dispersal Area Monitoring below) to monitor survivorship, tortoise density, health (methods below), and habitat quality (see Dispersal Area Monitoring, below) at the Rodman-Sunshine Peak North site. Due to limited access to the Sunshine Peak Training Area (TA), we will not track many telemetered tortoises at the normal schedule used at other sites. However, when we have access to Sunshine Peak TA, we will track those animals, determine individual survivorship, measure their health status, and identify their location for simple dispersal measurements (e.g., distance from release sites; Field et al. 2007 & Nussle et al 2012). The ability to track these individuals will provide powerful, repeated measures on individuals. For those individuals that do not stay in or disperse into Sunshine Peak, we will monitor them per normal schedules. We will collect frequent measurements on locations, calculate home ranges (and overlaps with residents), and record behavior and general status and health at radiotracking events. Transmitters for these animals will be removed prior to battery expiration so tortoises are not burdened with non-functioning transmitters.

Additionally, when we have access to Sunshine Peak TA, we will perform, for the first three years, a series of line transects across the broad dispersal area to a) estimate tortoise density for the dispersal area, and b) collect data on as many tortoises, residents, translocatees, transmitters, untransmitters, marked, and unmarked tortoises in Sunshine Peak. This will help us find animals in each of these categories that are translocatees or residents and enable us to perform health assessments, increasing sample sizes and statistical power. We anticipate access two to four times per year. During the first couple of years tortoises will likely disperse across most of the dispersal area. After the first three years we will use these data to determine if there are suitable plot locations for long-term (e.g., 5-year intervals) monitoring, or sustain monitoring via the line transects.

We will consider Global Positioning System (GPS), satellite, or cellular transmitters for monitoring when the technology becomes suitable to not compromise tortoise survivorship.

Table 5. Main study objectives, methods used, and variables used in two critical facets of effectiveness monitoring: Survival and Assimilation. For each Method, we list the primary dependent variables (indicator variables) and secondary indicators gathered while measuring primary dependent variables. Independent or predictor variables range from select categorical variables (e.g., treatment group) to uncontrolled continuous variables (e.g., rainfall or annual plant biomass); they are not listed with any one method. BCS = body condition score. COD = cause of death

Study Objective	Methods	Dependent Variables, primary	Secondary indicators, from Method	Independent Variables
Survival	Tracking	Individual, annual & percent survivorship (per group, site, sex, age, etc.)	COD estimation (e.g., predator, drought, disease or vehicle strike)	Groups - Translocatees, Residents, Controls
			Simple health measures - trauma & clinical sign	Site
			Behavior (e.g., fighting, pacing, active, dormant or thermoregulating), time spent aboveground, and coversite choice & formation	Research treatment (density, grazing, constrained dispersal, translocation distance, headstart); not independent of site
			Spatial - movement frequency, distance & displacement; home range or activity areas	Sex - male, female, undiscernible or juvenile
	Mark-Recapture Plots	Density; among-year recaptures and carcass information contribute to survivorship estimates, as above	Health, behavior, movement & COD as above	Size & condition [†] - body mass, carapace length, shell volume (covariate); BCS & body density (see also Secondary Indicators)
			Changes in population density and demography (size and sex frequencies) may support or contradict survivorship measures	Time since translocation
			Growth - change in mass, length, volume, and secondary sexual characters	Weather, especially rainfall (mm) per winter, season or other relevant period, including prolonged drought; dichotomous, index or continuous-scale (ratio-scale) data from gauges
Health Assessments	Health Assessments	Recapture and carcass information contribute to survivorship estimates, as above	Full health measures, incidence (ranking, %) and severity (categorical or indices) of trauma and clinical signs, condition indices, ELISA results (positive, negative or suspect categories, for both <i>Mycoplasma</i> spp.), growth	Habitat condition, change; annual plant cover, invasive plant cover

			COD, behavior and growth as above; palpation of eggs	Cattle grazing - dichotomous, index or continuous-scale (ratio-scale)
	Transects	Recapture and carcass information contribute to survivorship estimates, as above	Density, demography, COD, and general health, behavior & growth as above	Ground or vegetation disturbance (e.g., vehicle) - dichotomous, indexed or continuous-scale (e.g., vehicle track counts) Predator counts (e.g., Common Raven and coyote) - presence or absence, indices, point counts or point count rates Proximity to predators & subsidies (e.g., transmission lines, raven nests, human communities or recreation areas)
Assimilation	Microsatellite markers & single nucleotide polymorphisms	Egg and clutch paternity (group assignment) ²	Annual egg & hatchling production, # per female	Group (Translocatees, Recipients, Controls), site, treatment, translocation distance (e.g., WEA or SEA to Bullion) and time since translocation (e.g., 3, 5, 7 & 9 years post-translocation); see Survival above for additional variables, such as body size
	Tracking, health assessment and transect encounters	Behavior (e.g., fighting, mating, egg-laying, pacing, active, dormant or poor thermoregulation), responsiveness, posture, and coversite co-use (e.g., mixed group)	Spatial - movement frequency, distance & displacement; palpation for eggs: during health assessments (in season)	as above
	Tracking	Spatial - overlapping home range or activity area	Behavior, as above	as above

1. Growth and condition can be used as an indicator or predictor variable, depending on the particular analysis.

2. Davy et al. (2011) & Rico & Murphy, unpublished data for NREA, MCAGCC

Table 6. Number of tortoises to be translocated to each recipient site. Size categories for adults (carapace length ≥ 160 mm) and juveniles (carapace length < 160 mm) follow USFWS (2012). Juveniles with carapace length < 110 mm will be translocated after headstarting.

Recipient Site	Initial Density (tortoise/km ²)	# Adults to Translocate	Density Increase	# Juveniles to Translocate
Lucerne-Ord	5.2	450	53% [1.57SE]	224
Rodman-Sunshine Peak North	4.9	186	37% [1.08 SE]	105
Siberia	2.6	115	71% [1.90SE]	57
Broadwell	5.1	47	18% [0.49 SE]	23
Cleghorn Recipient (constrained)	6.5	52	100% [2.32 SE]	4
Bullion Recipient	10.4	148	27% [1.90 SE]	84
Total		443		497

Table 7. Approximate number of transmitter resident and control tortoises targeted for each site. Sex ratios mirror sex ratios on the relevant impact area (1.3:1 for the WEA, 1.0:1 for the SEA).

Size Cohort (Sex/Transmitter Size)	≥ 160 mm MCL			~120-159 (RI2B-6 g)
	Male	Female	Total	
RECIPIENT SITES				
Lucerne-Ord	35	25	60	15
Rodman-Sunshine Peak North	23	17	40	20
Siberia	11	9	20	0
Broadwell	11	9	20	0
Cleghorn Recipient	10	10	20	0
Bullion Recipient	15	15	30	0
TOTAL Resident Tortoises			190	35
CONTROL SITES				
Rodman-Sunshine Peak South	25	19	44	15
Daggett	31	24	55	20
Ludlow	12	9	21	0
Calico	11	9	20	0
Rodman	11	9	20	0
Cleghorn Control	10	10	20	0
Bullion Control	15	15	20	0
TOTAL Control Tortoises			190	35

Mark-Recapture Plots

We will repeatedly evaluate mark-recapture plots at control and recipient sites to help monitor the survival of translocatees and residents (see above for approach to survival analyses). These plot analyses will also provide estimates of tortoise density (tortoises per km²) and demography (e.g., sex and age structure), and support planned measures of site fidelity (e.g., Nussear et al. 2012), health assessments (see below), and other variables (e.g., habitat condition and health parameters) that may determine or help explain the survivorship of the groups at the translocation and control sites. These plots, especially control plots, will also provide a general reference for population monitoring in the area.

Twelve 1-km² plots have been established in the recipient and control areas, five in control sites and seven in recipient areas (Table 2). Each plot will be surveyed for population density and structure every five years for 30 years, an interval consistent with Strategy 4 of the revised Recovery Plan (USFWS 2011a). Standard mark-recapture techniques (e.g., Lincoln-Peterson) will be employed, with at least two passes, and all captured tortoises weighed, measured, photographed, sexed, and described. For these demographic plans, we will collect the additional data identified above for live and dead tortoises found during tracking. We will assess health, test for *Mycoplasma* spp. antibodies (see Section 6.3, below), and store blood sample residues for genetic (see Section 4.2.4, below) analysis.

During each reading of the mark-recapture plots, we will assess habitat to monitor changes or stability. We will use standardized transects to measure percent cover, density, frequency, species richness, species evenness, and robustness of perennial plants. On these same transects, hydrology, annuals (percent cover and biomass by species), substrates, and soils will be measured on stratified-random quadrats. All annuals present on each transect, including all tortoise forage species, will be inventoried. Exotic annuals will also be measured to document spread and population increases. Surface disturbance will be measured by type and age. Perennials, soils, substrates, and hydrology will be measured every 10 years for 30 years. Annuals and surface disturbance will be measured every five years on all plots. Biomass will be measured on a subset of the mark-recapture plots every five years.

Further, we will quantify predator use of the site, documenting species, abundance, and distribution. Raven numbers (individuals and nests) will be recorded and the area below nests of both ravens and large raptors will be searched for tortoise remains. Qualitatively, OHV recreation, unforeseen developments, and any evidence of free-ranging dogs and/or coyotes will be documented and described. We have started raven surveys (Figure 4) and canid surveys (February 2016).

Health Assessments

The tortoise health assessments will help us find marked tortoises, transmitted or not, and monitor their survivorship. The assessments will provide health, disease, and trauma

indicators to help interpret group survivorship at and among sites and other categories (e.g., sex or age).

We will monitor disease incidence and other potential health issues via standardized assessments (USFWS 2015a, Berry and Christopher 2001) of clinical sign, injury, *Mycoplasma* spp. antibodies, cutaneous dyskeratosis, body condition scores, and mass-to-volume ratios [cf Loehr et al. 2004]) of telemetered tortoises, all tortoises captured on mark-recapture plots, and opportunistically on transect surveys (see *Transects*, below). For telemetered tortoises, a minimum of 150 transmittered tortoises (50 from each group, and at least 10 per site) will be assessed. A high site incidence of disease or trauma may trigger additional assessments for that site. We will assess health two times a year at each site, but once per individual tortoise per year, during the first five years when the initial stressors from translocation may be greater. We will repeat health assessments at 5 and 10 years when transmitters are removed. Formal health assessments and tissue collection (blood samples and oral swabs) will be performed in October (prior to brumation) and April when activity monitoring substantiates that tortoises are active enough to express immune system responses. In addition, each time a tortoise is handled it will be examined for clinical signs of disease and trauma.

Dispersal Area Monitoring

Although the radiotracking will provide the strongest information about survivorship via its relatively high sample size and repeated measures statistical analyses, the mark-recapture, health assessment, and density transect surveys will provide additional monitoring of the three groups (translocatees, residents, and controls). The mark-recapture data are limited to 12 localized sites, but tortoise density transects over dispersal areas can provide survivorship data of marked (transmittered or not) translocatees, residents, and controls over large areas of the study sites. These surveys will help us find these tortoises, help us estimate survivorship of groups, and help us quantify tortoise density (USFWS 2010), tortoise sign, predator sign, and anthropogenic disturbance. The latter measures will help interpret influences on tortoise survivorship. We will survey 1-km to 12-km long, line transects spaced over the recipient and control areas. Depending on tortoise density and the size of the dispersal area, there may be as many as 5 to 10 transect passes per km².

Also, we will use rain gauges at all sites to measure precipitation. We may install more sophisticated weather stations (e.g., Onset HOBO U30) at more protected sites to augment weather data (e.g., ambient temperature, wind speeds, relative humidity) collected by radiotrackers.

Data Analysis

We will analyze data from these for methods to evaluate the survivorship of the translocated and resident tortoises compared to control tortoises. Values not statistically different from the control values may be considered most successful (see Kaplan-Meier in *Tracking*, above). The additional data on behavior, burrow use, health status, habitat

quality, and other secondary variables (Table 5) may also be analyzed for effects on survivorship. We will consider additional tests and comparisons (e.g., analyses of variance comparing health status among controls, residents and translocatees, or between those that survive and those that died recently) as these may help explain the proximate causes of mortality. The number of comparisons possible is extensive, but may also include Analyses of Covariance (ANCOVA or MANCOVA) to evaluate categorical differences after correcting for covariates such as body size, body condition scores, distances moved, rainfall, or annual plant production. We may also consider multimodel inference analyses to evaluate effects of group, sex, site, rainfall, and other variables (e.g., Burnham and Anderson 2002; Nussear et al. 2012).

4.1.2 ASSIMILATION

Assimilation into the population would be accomplished if translocated tortoises reproduced successfully with resident tortoises. Results for Fort Irwin (R.C. Averill-Murray, pers. comm.) suggest that translocated males were not assimilating to the resident population (they did not produce offspring), but the translocated females produced offspring from resident males. There may be a period that translocated animals need to assimilate.

The main question is to what degree translocated tortoises assimilate with residents. Also, we may be able to use control values as an additional comparison for some measures of assimilation. We will evaluate assimilation via genetic analyses, but will also consider phenotypic data (e.g., home range overlap and site fidelity; Nussear et al 2012) that may indicate potential for mixing of individuals, or settling of individuals in the recipient areas. Genetic assimilation can be measured by paternity of individuals, clutches, and the combination for each group (translocatees and resident), by using assignment tests to compare offspring genetics (e.g., 20 microsatellite loci from genomic DNA; Davy et al. 2011) to those of the parent populations, translocatees, and residents (genetic results evaluated using discriminant analyses; Y. Rico and R. Murphy, unpublished data). The mixture of offspring among the two parent groups indicates a degree of assimilation. Little is known about the long-term viability of stored sperm, and how quickly new inseminations may influence offspring parentage. We may be able to evaluate the rate (e.g., years) at which clutches become more mixed, and what is the equilibrium state of mixing.

We propose evaluating genetic assimilation at years 3 and 5 post-translocation, and if data indicate assimilation requires longer, at later times (e.g., years 7 and 9). The blood sample residues, from which the DNA is analyzed (Rico and Murphy, unpublished data), are retained (banked) from the health assessment studies for the translocatees and the translocated residents. More residents can be sampled opportunistically in future health assessments. In late April 2019, we will assess whether females are gravid (via palpation, ultrasound scanning, or X-ray radiography) and transport gravid females to TRACRS to lay eggs, eat, and have a chance to rehydrate before being returned to the recipient site. When clutches hatch, we will analyze egg-shell DNA (or a small drop of hatchling blood) for individual and clutch paternity to assess genetic assimilation.

There are phenotypic data that suggest potential for assimilation, but are not as demonstrative as genetic assimilation described above. Movement distances or displacement (point to point), home range size and overlap, and indices of site fidelity (based on movement data) indicate how much space and habitat the translocatees share with residents (see Field et al. 2007 and Nussear et al. 2012). If they share these resources simultaneously, not segregated in time, it shows a strong potential for interaction and assimilation. Behaviors detected during tracking and other efforts (e.g., male-to-male fighting, sharing burrows, pacing site perimeters away from other animals), and isolated pockets of healthy animals or diseased animals of one group, also provide indices of isolation, conflict, or assimilation (e.g., lack of fighting, sharing burrows, restricted spread of disease). Home range overlap (% and unit areas), degree of agonistic behavior (number and intensity of bouts), and disease incidence (% clinically ill or ELISA positive) will be compared to those in control groups.

The reproductive output of female desert tortoises may also provide an index of assimilation. Isolated females or females with limited interaction with males can stop reproductive cycling (Gerald Kuchling & Brian Henen, unpublished observations) in captivity. This could happen in the wild if the females do not integrate well with the other group. Based on the Ft Irwin results translocated females may not limit assimilation (i.e., produce offspring with resident males) whereas translocated males may be limited in contributing to clutches of resident females. When we assess females for reproductive status in spring 2019, we can assess female reproductive status (gravid, non-gravid, and perhaps vitellogenesis; Henen and Hofmeyr 2003). Reduced cycling or vitellogenesis may take years post-translocation because females contain more than one size class of follicles in their ovaries and may take months to resorb follicles.

Assimilation may take time and will be monitored for change over time. Many of the same independent or predictor variables will be analyzed for assimilation as for survival (see Survival, Data Analysis above), with genetic, behavioral, and spatial (home range size and overlap), and genetic indicators of assimilation for each site. Comparing assimilation among translocatees, residents, and controls is the central question, but we will also analyze for effects of site, sex, health status, habitat condition, and weather.

4.2 OTHER RESEARCH

Although the main focus of a successful translocation is to maximize the survivorship and assimilation of the translocatees and residents, we are proposing five main recovery research questions and will consider other recovery-oriented research. We will perform these studies in concert with the primary survivorship and assimilation analyses, so most of the field and analytical methods outlined in Section 4.1.1, will be used to address these questions.

The five main research topics include:

1. Experimental translocation densities
2. Cattle grazing compatibility with desert tortoises

3. Efficacy of constrained dispersal as a tool for translocation
4. Effects of translocation distance
5. Efficacy of headstarting as a translocation tool

4.2.1 EXPERIMENTAL TRANSLOCATION DENSITIES

The primary emphasis of the translocation density analysis is to evaluate whether areas can support densities (number of tortoises per unit area, e.g., adults per km²) higher than existing densities (Table 6). Densities have declined considerably throughout much of the Mojave Desert (see Section 1.1 above), so habitat in these recipient areas may support higher than current densities. Second, the current guidance (USFWS 2011b) of post-translocation densities (one standard deviation, SD, above the mean for the recovery unit) is deliberately cautious and conservative, but needs experimental testing. For this region, the Western Mojave Recovery Unit, the mean and SD are 2.8 & 0.9 adults/km², respectively (USFWS 2015b).

We will test translocation density increases that are 0.5SE (0.9 adult/km²) to 2.3SE (6.4 adults/km²), or 17% to 100%, higher than current densities (Table 6) to determine if these areas can support higher densities of tortoises.

We will assess survivorship of controls, residents and translocatees as described above (4.1.1), including Kaplan-Meier and contingency table analyses for survivorship of animals monitored primarily via radiotracking but also via mark-recapture plots, health assessments and dispersal area assessments. We hypothesize that survivorship among the groups (controls, residents and translocatees) would not differ among the translocation density categories (translocation densities). The alternative results (or hypotheses) would include translocatee survivorship is lower at the higher translocation densities (consider survivorship plotted against translocation densities (e.g., % or SE increase, Table 6). Resident survivorship may also be lower at higher translocation densities.

Within the context of translocation density tests for sites, we will also consider variation due to other categorical or continuous variables (e.g., sex, age, size, health status, habitat condition, rainfall, or indices of predator abundance). As with Nussear et al. 2012, we will consider AIC_c – based model selection to evaluate models including group, site, sex and other variables.

As described above for assimilation, we will evaluate genotypic assimilation including clutch paternities and genetic distances of offspring relative to the resident condition and translocatee condition (genetic diversity and genetic distance from residents). We hypothesize that offspring paternity and genetic diversity will be mixed intermediates including parents of both resident and translocatee parents, and genetic distances intermediate between resident and translocatee conditions. The number of translocatees relative to residents may influence the frequency of intermediate paternity clutches and average genetic distance between the two groups. These may also change over time, as described above (Section 4.1.1), but may settle within two years as translocatees settle and develop new site fidelities (Nussear et al. 2012). Hopefully they will settle within the

first five years of monitoring (with the larger samples sizes, n=225 per each group). Differences may be more difficult to detect as animals settle, and as radiotransmitter sample size is reduced to 50 per group in year six post-translocation.

We also hypothesize that the phenotypic variation (e.g., movements, home range size, home range overlap, site fidelity measures) of residents and controls will not differ between residents and translocatees within sites, and among translocation densities. If translocation density affects phenotypic variation, we may see differences among controls, residents and translocatee indices of assimilation (e.g., movements, home range size) with translocatees moving more and having different shaped or larger home ranges than residents have (Field et al. 2007, Nussear et al 2012). The differences may also disappear over time as translocatees settle (ca., in 2 years, Nussear et al. 2012).

We will also use various types of ANOVA to analyze for effects of group, sex, size, behavior, health status and other variables that may help explain different levels of phenotypic variation between groups, and between those that survive and those that die.

Each year for the first five years, we will also assess tortoise density via USFWS- (2015b) and TRED-consistent (Karl 2002) methods that have been used to evaluate tortoise density on the expansion areas and Combat Center since 2008.

4.2.2 CATTLE GRAZING COMPATIBILITY WITH DESERT TORTOISES

Grazing may contribute to the decline of desert tortoise populations (USFWS 1994a, 2011a, Boarman 2002). While there is a substantial body of information that shows both long-term and short-term changes to habitats as a result of grazing, the detrimental effects are not consistent and some benefits may accrue (Ellison 1960). Specific to desert tortoises, little definitive and focused research has been completed on the effects of cattle grazing (Avery 1998, Lovich and Bainbridge 1999). In the absence of information, but assuming that grazing is detrimental, landscape-level conservation actions have targeted the closure of allotments and have revised grazing management of other allotments (USFWS 2011a).

Studies to illuminate the specific grazing factors that affect desert tortoises will assist USFWS and CDFW in recovery efforts. These studies also may assist the allotment operator in revising grazing management practices to accommodate both cattle and tortoises, as an alternative to retiring the allotment. Such studies are encouraged by the revised desert tortoise recovery plan (USFWS 2011a:78). The Ord Mountain Cattle Allotment overlaps the Lucerne-Ord Recipient Site, thus providing an opportunity to examine the effects of grazing on desert tortoises. Both historic and current data on tortoise populations and grazing practices are available, thereby permitting an analysis of both long-term and short-term effects. The design of this study is currently under development and will be provided to USFWS for comment and approval prior to implementation.

We will measure the same basic survivorship, assimilation, tracking, plot density assessments, health assessments, dispersal area evaluations, and secondary or explanatory measurements indicated above. These analyses will be completed in a dispersal area next to a grazing allotment and within the grazing allotment. We will perform the same data analyses and statistical comparisons among groups, residents, translocates, and controls, but also with the comparison of data between grazed and ungrazed areas. We will use more than one control area (e.g., Daggett and Rodman-Sunshine Peak South) to bolster statistical power. Our null hypothesis is that there will be no difference between grazed and ungrazed areas for all of our comparisons.

4.2.3 EFFICACY OF CONSTRAINED DISPERSAL FOR SPECIES RECOVERY

Constrained dispersal is a technique wherein tortoises are translocated to a fenced site to encourage settling before the fence is removed. Unlike simple translocation to unfenced sites where tortoises may travel away from that site, the tortoises remain because they have established home ranges and become part of the social hierarchy within the fenced area. In this way, specific locations can be augmented, a critical feature if translocation is targeting depressed, depleted, or other specific areas. Results from one constrained dispersal study in the western Mojave Desert (Karl 2006) strongly suggest that the technique has merit.

We propose a constrained dispersal experiment to evaluate constrained dispersal as a recovery action, especially for depressed or depleted populations. The Cleghorn Recipient Site will be the single constrained dispersal site. Because the habitat has remained undisturbed in this area the number of tortoises that will be translocated to this site will attempt to result in post-translocation densities that may approximate historic densities. Current data for tortoises ≥ 160 mm indicate densities in the Cleghorn Lakes RTA ranging from 3.2 to 16.5 tortoises/km² (Table 8). The Cleghorn Recipient mark-recapture plot was sited in the square kilometer with the highest indication of tortoise density based on 2015 TRED transects (A.E. Karl, unpub. data). By contrast, the mean density for the West Mojave Recovery Unit (USFWS 2015) is substantially lower than actually observed locally. To maximize translocation success while still examining constrained dispersal as a translocation tool, 52 tortoises will be translocated to the constrained dispersal site. This is based on mean density measured during clearance surveys.

MCAGCC will install temporary tortoise exclusion fencing around the site perimeter (see Section 3.4.1, above, for fencing details). All tortoises in the constrained dispersal study will be transmittered and monitored for survival, assimilation, movements, home ranges, health, disease, and additional explanatory variables (e.g., demographics, predator indices, and weather), identical to the methods and schedule identified above (Section 4.1.1). Tracking will follow the schedule for all telemetered tortoises in the translocation program to support collecting data on locations, movements, burrow use, and behavior. MCAGCC will remove the tortoise exclusion fencing two years after initial translocation to permit tortoises to join the greater population. Repatriation will be assessed by continued monitoring of subsequent tortoise movements and comparing them to those of

control tortoises at the Cleghorn Control Site. Tracking will end at Year 10, consistent with the cessation of tracking on the larger telemetered group.

Table 8. Tortoise density data at the Cleghorn Lakes RTA and the number of tortoises that can be translocated into the Cleghorn Constrained Dispersal Site based on a 100% increase in population size. Density is calculated from two mark-recapture plots and clearance surveys in the SEA impact area¹. Mean density for the West Mojave Recovery Unit (USFWS 2015b) is provided for comparison.

Source	Current Tortoise Density (Point Estimate) (# tortoises/km ²)	Post-Translocation Density-100% Augmentation (# tortoises/km ²)	Alternatives for Number of Tortoises to be Translocated for 9.2 km² Constrained Dispersal Site
Cleghorn Recipient Mark-Recapture Plot (2015)	16.5	33.0	16.5 * 8.1 = 134
Cleghorn Control Mark-Recapture Plot (2015)	12.1	24.2	12.2*8.1 = 99
Clearance Surveys for 12 km ² (2015)	Mean = 6.4 (3.2-11.8)	12.8	6.4*8.1 = 52 (selected)
West Mojave Recovery Unit Mean	2.8	5.6	2.8*8.1 =23

1. Density is the number of tortoises found in each full survey cell, assuming 74% of tortoises found on each pass, 93% cumulative.

We will record the same variables and complete the same analyses as for other sites. However, we anticipate that the constrained dispersal may expedite rates of assimilation, development of site fidelity, and home range overlap compared to the control site and other sites; we may advance comparisons to earlier periods compared to other experimental analyses. After the eastern fence is removed in 2018 or 2019 we anticipate very little additional dispersal will occur, as residents and translocatees will have settled inside the pen with their new neighbors. Still, we must document this settling and site fidelity by continued monitoring of transmitted animals (circa 20 tortoises per group during the first five years) and untransmitted animals in surveys.

4.2.4 EFFECTS OF PHYSICAL AND GENETIC DISTANCE

Translocation risks mixing tortoises with different genotypes (see review and analysis by Averill-Murray and Hagerty 2014) and phenotypes, although the former is typically emphasized when evaluating translocations. In this translocation, we have the opportunity to evaluate both over a relatively short distance (<100 km). See Section 4.1.2, above, for additional details, especially concerning metrics besides genetic distances.

We have mapped genetic distances among tortoises of the WEA, SEA, and a few additional areas within MCAGCC, including the Bullion RTA. Similar to early studies

(Murphy et al. 2007, Hagerty et al. 2011, Averill-Murray and Hagerty 2014), there is a general pattern of divergence by distance (Rico & Murphy, unpubl data), with sites near the WEA clustering, sites near the SEA (Cleghorn Lake & Bullion RTA) clustering, but genetic distance substantial between the Bullion RTA and some WEA tortoises. The Bullion recipient area is only 60 to 70 km from the WEA tortoises, and about 10 km from the SEA tortoises, the latter probably linked to the Bullion RTA via the Cleghorn Lakes Wilderness (Figure 2b). Both of these distances are much less than the more than 200 km recommended physical limit for translocation before incurring a risk of outbreeding depression (Averill-Murray & Hagerty 2014). This is an opportunity to evaluate the relative success of translocating tortoises with some physical and genetic distance. We propose to move 112 and 36 tortoises from the WEA and SEA, respectively, to the Bullion Recipient site, a 100% experimental increase in density (Table 6). We would select WEA tortoises that had habitat similar to the SEA tortoises. The main difference between this and other recipient sites would be the physical and genetic distances. With data collected during survivorship monitoring (see Section 4.1.1, above), we could compare data among the WEA, SEA, residents, and Cleghorn Lake controls for patterns of mixing or segregation.

Having the DNA samples from the tortoises will also allow us test whether clutches produce offspring that are segregated or mixed among the WEA, SEA, and residents, and quantify the amount of mixing (see Assimilation, above). We would test this at about three years post-translocation, after tortoises have had time to settle. In late April 2019, we will collect gravid females and analyze eggshell DNA, as detailed in Section 4.1.2, above, to assess genetic assimilation among WEA, Bullion Residents, and SEA tortoises. We will repeat this prior to removing transmitters at the five year mark, and on subsets of translocatees that are monitored for the ten year period.

Our analyses will evaluate the effect of translocation distance on degree of assimilation. However, shorter translocations are likely to be less distinct genetically (shorter genetic distances, F_{ST} , between populations) and more difficult to distinguish offspring from either parent population.

We will record the same variables and complete the same analyses as for other sites and research questions. We hypothesize (null hypothesis) that there will be no significant differences between groups, sites, and sexes for most variables including survivorship, movements, site fidelity, demographics, and health. Also, the assimilation measures will be similar among sites, with the exception of the degree of genetic diversity among offspring, and perhaps the net genetic distance of sites relative to other sites. As genetic distance tends to be correlated to physical distance between sites, we anticipate little net increase in offspring genetic diversity at recipient sites close to donor sites (e.g., Bullion relative to Cleghorn impact areas) but a larger increase in offspring genetic diversity with more disparate sites (e.g., Bullion relative to WEA donor areas). Between close sites, it may be difficult to measure statistical differences in net diversity change because both sites should already be similar, at least compared to sites separated by greater distances.

4.2.5 THE USE OF HEADSTARTING IN TRANSLOCATION

MCAGCC is researching the efficacy of headstarting using long-term efforts. We may supplement these headstart data by monitoring the survivorship, growth, and health of small tortoises to be translocated. Almost nothing is known of the survivorship of juvenile tortoises, and these data for small tortoises will provide a comparison to the wild juvenile, translocatees, residents, and controls being monitored (35 per group).

MCAGCC is holding, protecting, and feeding 235 small, WEA & SEA tortoises at the TRACRS headstart facility because these tortoises are too small to receive radiotransmitters, and would be nearly impossible to find again in the clearance surveys. We will monitor their survivorship, growth, condition, and disease status at the facility and after the translocation. These data will be compared to those of large and small translocated, resident, and control tortoises. However, the post-translocation data for holding pen tortoises will be most robust for the largest tortoises (ca. 30) that we fit with radiotransmitters prior to their translocation.

We will measure and analyze the same survivorship, movement, dispersal, behavior, burrow use, growth, and health for comparing adults and juveniles in the initial translocation. We hypothesize the headstart animal data will be similar to that of residents and controls of similar body sizes (e.g., near 120mm carapace length [CL]). We also hypothesize that juvenile survivorship, movement, and dispersal will be lower than that of adults and large juveniles (ca. 160 mm CL) of all groups for each site. This may be explained by body size effects (e.g., surface to volume ratios) if larger tortoises experience higher survivorships, and larger tortoises perform better (e.g., survivorship, body condition scores and being healthy) in drought seasons and years. These data will be analyzed via the same statistical methods as indicated above for survivorship and other research questions, but assimilation measures would be restricted to phenotypic variables since these animals will not be reproductive. We may repeat similar levels of monitoring for additional cohorts of the headstarted animals, but may release some without transmitters after headstarting them to 100-120mm CL. As described for all translocatees, we will document the survivorship and other data of these released, holding-pen tortoises when we find them opportunistically or in mark-recapture plot and transect surveys.

5.0 PHYSICAL PROCESSES OF TRANSLOCATION

5.1 TORTOISE COLLECTION AND PROCESSING

Translocation in 2016 will occur in very early spring, shortly after tortoises become active. Tortoises must have adequate time to find or dig new refuges in the unfamiliar recipient areas prior to the onset of lethal surface temperatures, roughly 43-45°C (Zimmerman et al. 1994, Karl unpub data). Translocation can only occur if ambient temperatures will not exceed 35° (95°F) within one week of release and 32°C (90°F) within three hours of release (USFWS 2011b). Translocation in future years may occur in early spring or fall, in accordance with published guidelines (USFWS 2011b).

To meet the temperature goals, we expect to translocate approximately 100 tortoises per day, completing the translocation for the 1,138 tortoises by the end of the first week in April (or earlier if temperatures are unusually warm). Authorized handlers (see Section 6.1, below) will find and collect the tortoises, which will have been radio-tracked within one week prior to facilitate finding them. All tortoises will be transported in individual, sterilized plastic tubs with a lid and brought to local processing centers, where they will receive a visual health assessment. Any tortoise with clinical signs of disease will be transported to the TRACRS holding pen and not translocated (USFWS 2012), unless notified otherwise by USFWS. Transmitters will be removed from the tortoises that are not part of the study.

Depending on environmental conditions and hydration states, tortoises to be translocated may need to be hydrated within 12 hours before release, according to existing protocols (USFWS 2011b). The latter may include soaking in shallow water or epicoelomic injection of sterile saline or nasal/oral administration of drinking water at rates identified in USFWS (2015a). Tortoises <100mm will only be offered fluids nasally or orally. We will record the tortoise's mass before and after this procedure. Should a tortoise void, it will be re-hydrated using these techniques and rinsed thoroughly to remove predator-attracting odors.

5.2 TORTOISE TRANSPORTATION AND RELEASE

Each tortoise will be boxed and walked or driven to one of several dispatch points, where groups of tortoises will be flown by helicopter (preferably) or driven to a drop-off point at the relevant translocation area, according to the approved disposition plan for that tortoise. Biologists will carry the tortoises from the drop-off point to release them at designated release sites. During all transportation, tortoises will be kept shaded, away from hot surfaces, and padded as needed to avoid shell or internal trauma.

All tortoises will be released under shrubs and the UTM coordinates recorded. Juvenile tortoises are highly vulnerable to predation and require special consideration for successful translocation. Small tortoises will be released in the morning to avoid inadvertently attracting nocturnal predators to a release site. All juveniles will be released near inactive rodent burrows or other protective cavities.

6.0 PROCEDURES APPLICABLE TO ALL ACTIVITIES

6.1 AUTHORIZED HANDLERS

USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist" (AB) (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt; USFWS 2009a). Such biologists have demonstrated that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Specific ABs will be approved to perform specific tasks, including such specialized tasks as health assessments, blood sampling, and transmitter attachment. Only those biologists authorized by USFWS and CDFW can perform

specific tortoise handling tasks and clearance surveys. For USFWS, ABs are permitted to approve specific desert tortoise monitors (BM)s to assist in certain tasks, at the AB's discretion, without further approvals from USFWS. Direct supervision of monitors by the AB (i.e., voice and sight contact) is required for all clearance surveys and certain other specialized tasks. All ABs will be authorized via MCAGCC permits from USFWS (TE17730-5) and CDFW (Scientific Collecting Permit [SCP] 10112).

6.2 HANDLING TECHNIQUES AND TEMPERATURES

All tortoise handling will be consistent with NREA permits and the BO (USFWS 2012) and will be accomplished by techniques outlined in the USFWS *Field Manual* (2009b: Sections 7.6-7.8), including the most recent disease prevention techniques (e.g., USFWS 2015b). Handling time will be minimized to the extent possible to avoid stress to the animals. Handling will adhere to USFWS (2010b) handling temperature guidelines; tortoises may be handled only when air temperature measured at 5 cm (2 in) above the ground (shaded bulb), is not expected to exceed 35°C (95°F) during the handling session. If the air temperature exceeds 35°C during handling or processing, desert tortoises will be kept shaded in an environment where the ambient air temperatures do not exceed 32.7 °C (91°F) and air temperature does not exceed 35°C.

6.3 HEALTH ASSESSMENTS

Methods detailed in *Health Assessment Procedures for the Desert Tortoise (Gopherus agassizii): a Handbook Pertinent to Translocation* (USFWS 2015a) will be followed for all sampling techniques and equipment. Health assessments and tissue collection will not occur until after 15 May or four weeks from the time individual tortoises have become active after winter brumation, unless approved by USFWS (USFWS 2015a).

Mycoplasma agassizii, *M. testudineum*, and herpesvirus are the major pathogens currently being sampled, but other pathogens may be tested as their evaluation techniques become validated for desert tortoises. Blood samples will be taken via subcarapacial venipuncture; oral mucosa will be sampled with oral swabs. A physical examination, including the oral cavity, will focus on clinical signs of disease, body condition, and ectoparasites. Careful attention will be paid to sample collection, processing, storage, shipping, and disease transmission to optimize the sampling program and minimize any risks to tortoises. If a tortoise voids, it will be re-hydrated using permitted methods (USFWS 2015a).

6.4 TRANSMITTERS

Larger tortoises (≥ 160 mm in carapace length [MCL]) will receive Holohil RI-2B transmitters (24 mm wide by 11 mm thick; 15 g; www.holohil.com). Large juvenile tortoises will receive small RI-2B transmitters (6 g) and small juveniles that are large enough to transmitter will be affixed with Holohil PD2s (2-4 g). All transmitters will be appropriate for the tortoise's size, shell shape, and mass, and in no case will be greater than 10% of the tortoise's mass. Transmitters will be epoxied to a carapace scute using five-minute gel epoxy. For males and juveniles, transmitters generally will be affixed to

the fifth vertebral; for females and large juveniles believed to be females, transmitters will be affixed to the anterior carapace in the most appropriate location for the animal's shell shape that will preclude interference with righting. The transmitter antenna will be fed through a plastic sheath with a diameter slightly greater than the antenna. This sheath will be epoxied low on the carapace, just above the marginal scutes, and split at the scute seams (growth areas). This technique will permit the antenna to slip freely in the sheath, thereby precluding distortion on growing tortoises. Because the antenna sheath may be tightly curved on a very small tortoise, potentially constricting antenna movement with subsequent growth distortion, much more of the antenna will remain free on small tortoises, including only being attached on the fifth vertebral to minimize torque on the battery. Transmitters will be changed as necessary, earlier than battery life suggests or when the units appear to be malfunctioning. We will record transmitter details (manufacturer, serial number, frequency, installation, and all change dates) for all tortoises and submit this spreadsheet with the annual reports to USFWS and CDFW.

6.5 TORTOISE MORTALITIES

Should a transmitted or translocated tortoise die, the cause of death will be determined to the extent possible. NREA will submit this information and the tortoise location to USFWS and CDFW verbally within 48 hours, or via e-mail within five business days. In the annual report, (see Section 8.0, below), MCAGCC will provide a detailed accounting of all mortalities, circumstances, and actions implemented to prevent similar instances in the future (USFWS 2012). Fresh carcasses may be salvaged and necropsied upon direction from NREA.

7.0 FUTURE CLEARANCES

Fencing is not proposed for the high and medium impact areas to exclude tortoises from entering the impact areas. Consequently, additional clearance surveys are required in subsequent years to minimize tortoise losses. During each year, clearance surveys will be performed on any square kilometers in the impact areas that had three or more tortoises in the previous clearance (USFWS 2012). All clearances will be consistent with methods described above. For any tortoise found, the standard measurements and assessments that were used on other tortoises will be completed and the tortoise numbered and transmitted. All tortoises that are suitable candidates for translocation, based on the health assessment, would be translocated to designated recipient sites in accordance with the approved disposition plan for each tortoise.

8.0 REPORTING

On January 31 of each year (USFWS 2012), MCAGCC will provide a full accounting of all activities associated with the translocation program, both for the calendar year and cumulatively, plus analyses undertaken relative to the effectiveness of the translocation program. The report will include metadata consistent with NREA's recovery permits (TE-017730-5 and SCP 10112). MCAGCC will also engage USFWS and CDFW via telephone, as necessary, to keep the agencies involved and informed, and implement

contingency measures in the event unanticipated problems arise (e.g., mortality events, heightened predation).

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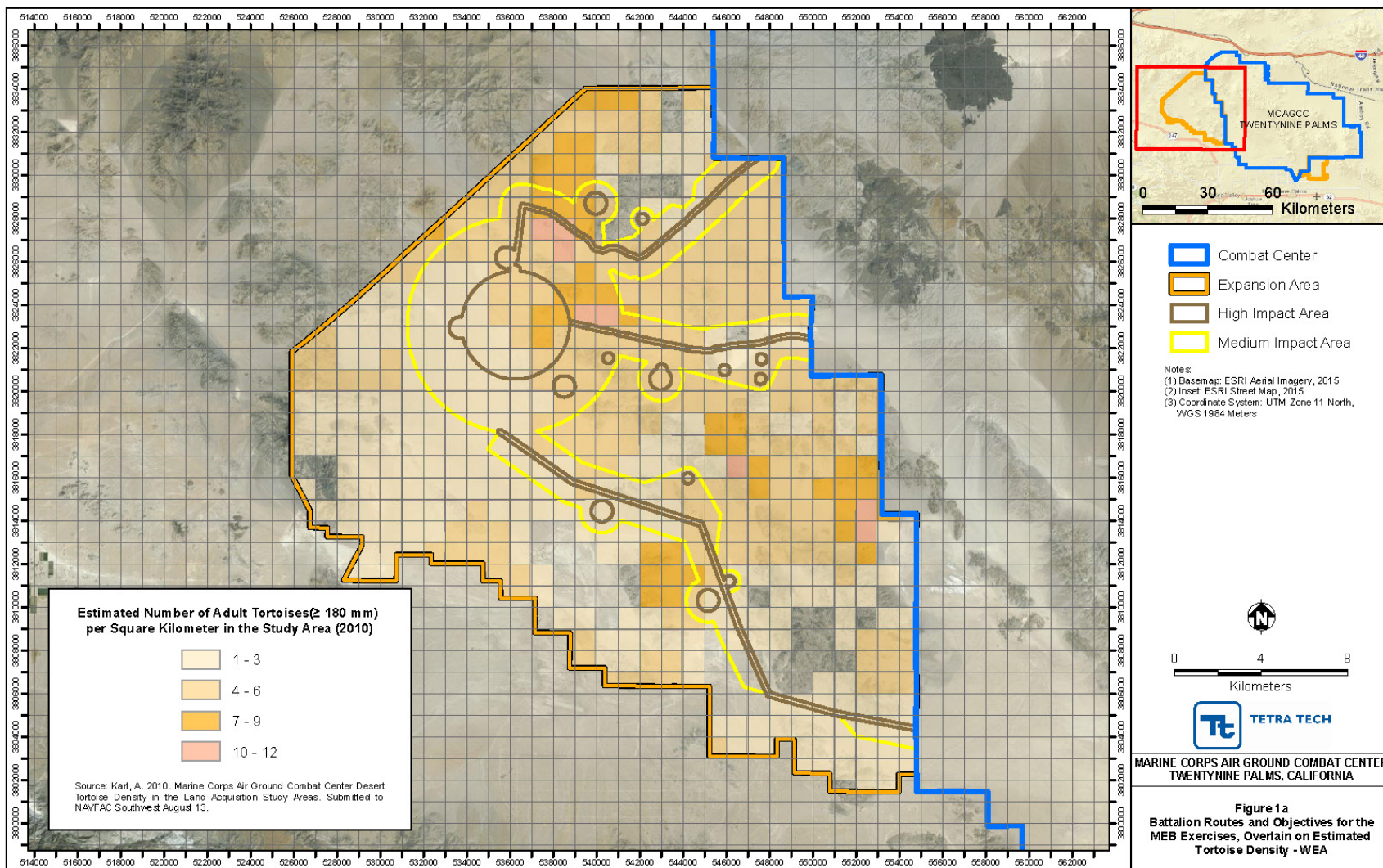
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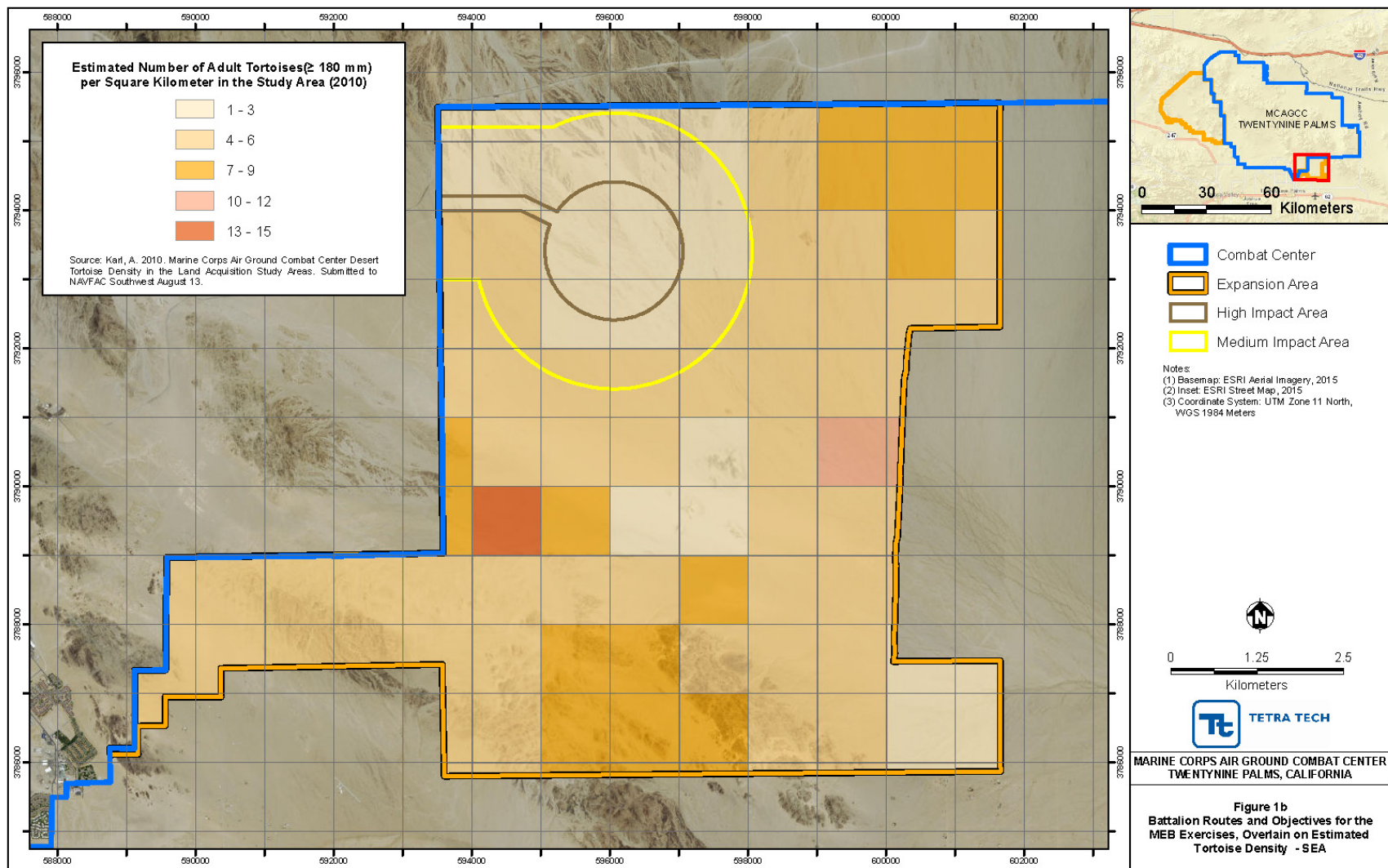
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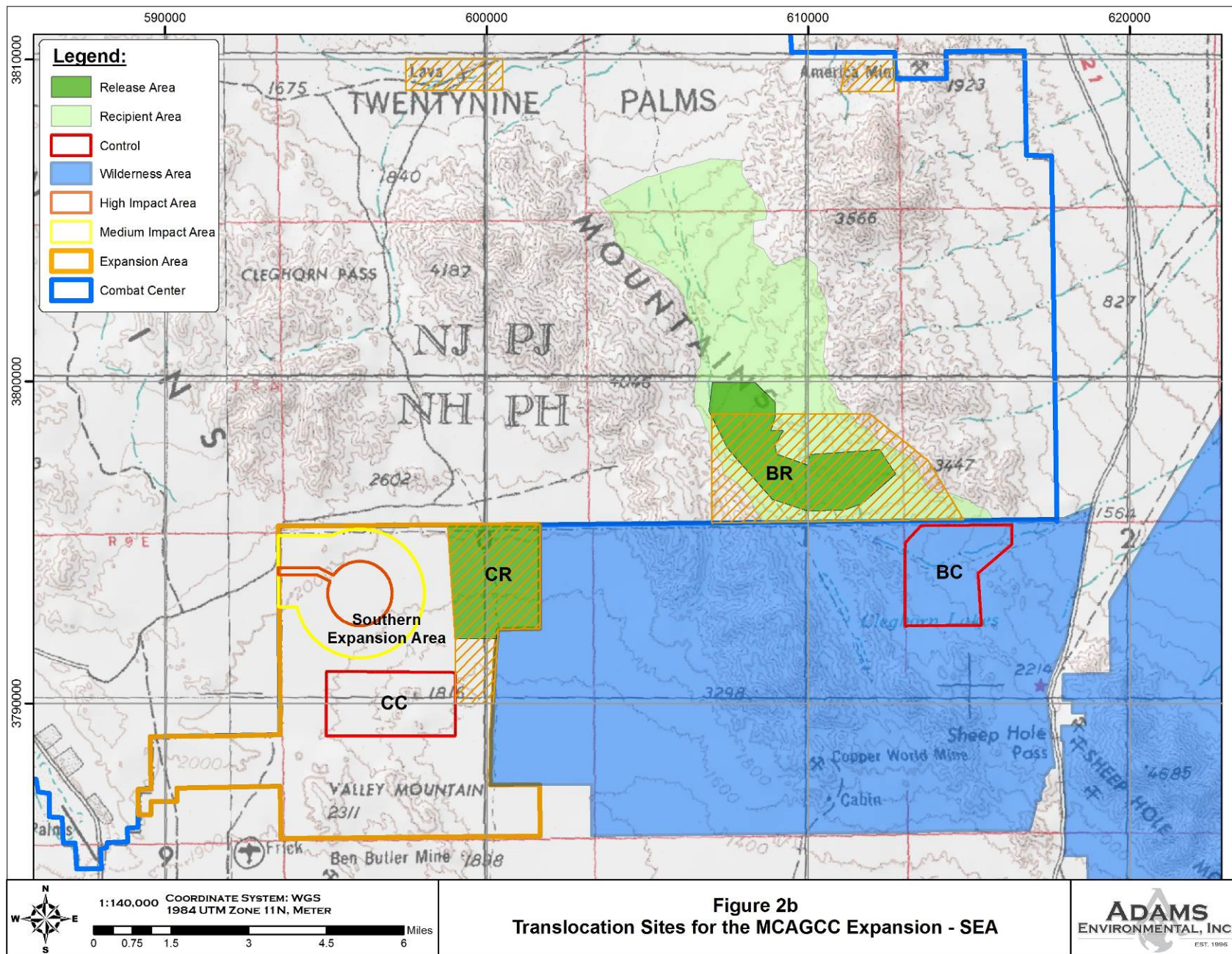
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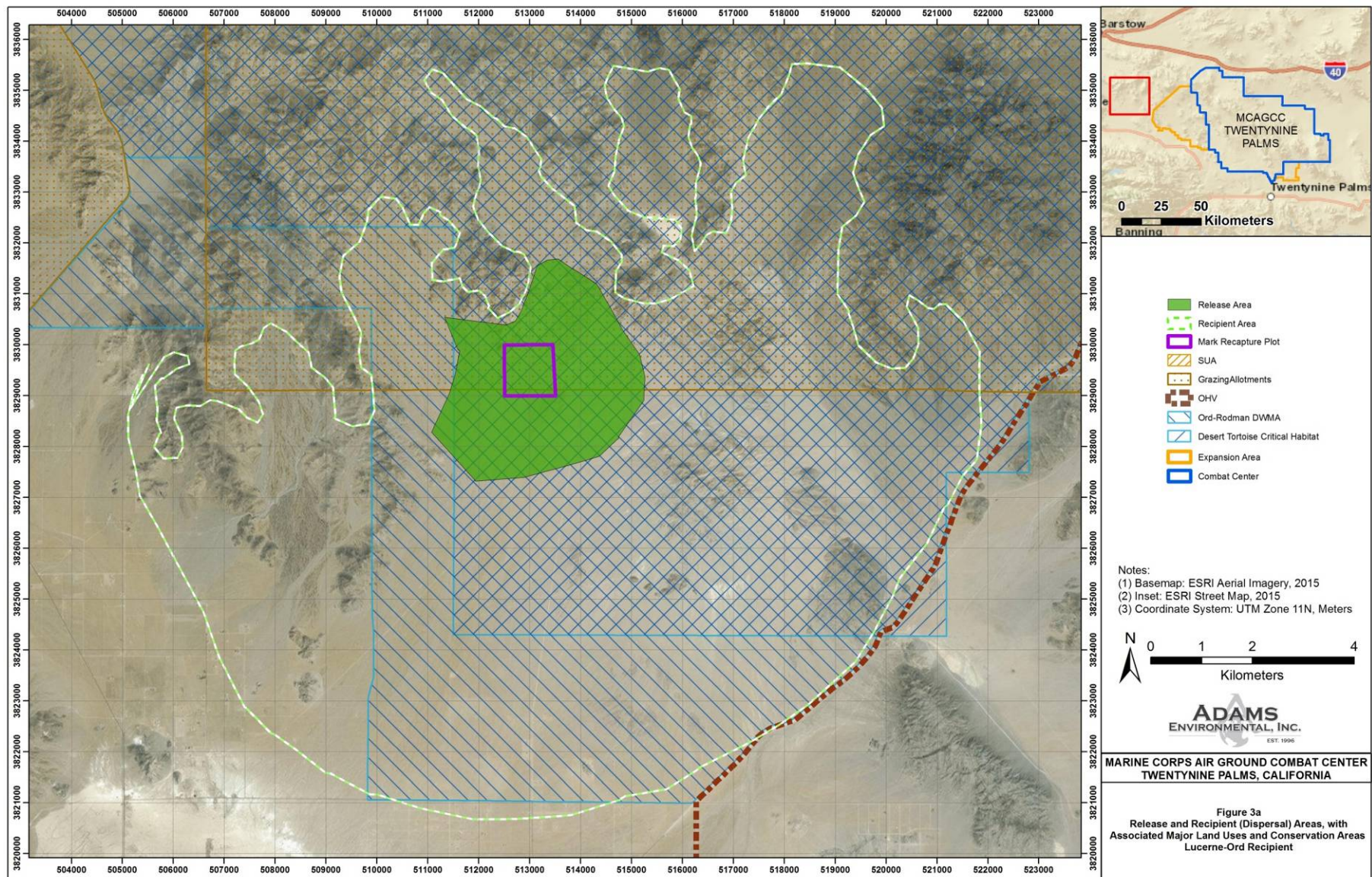
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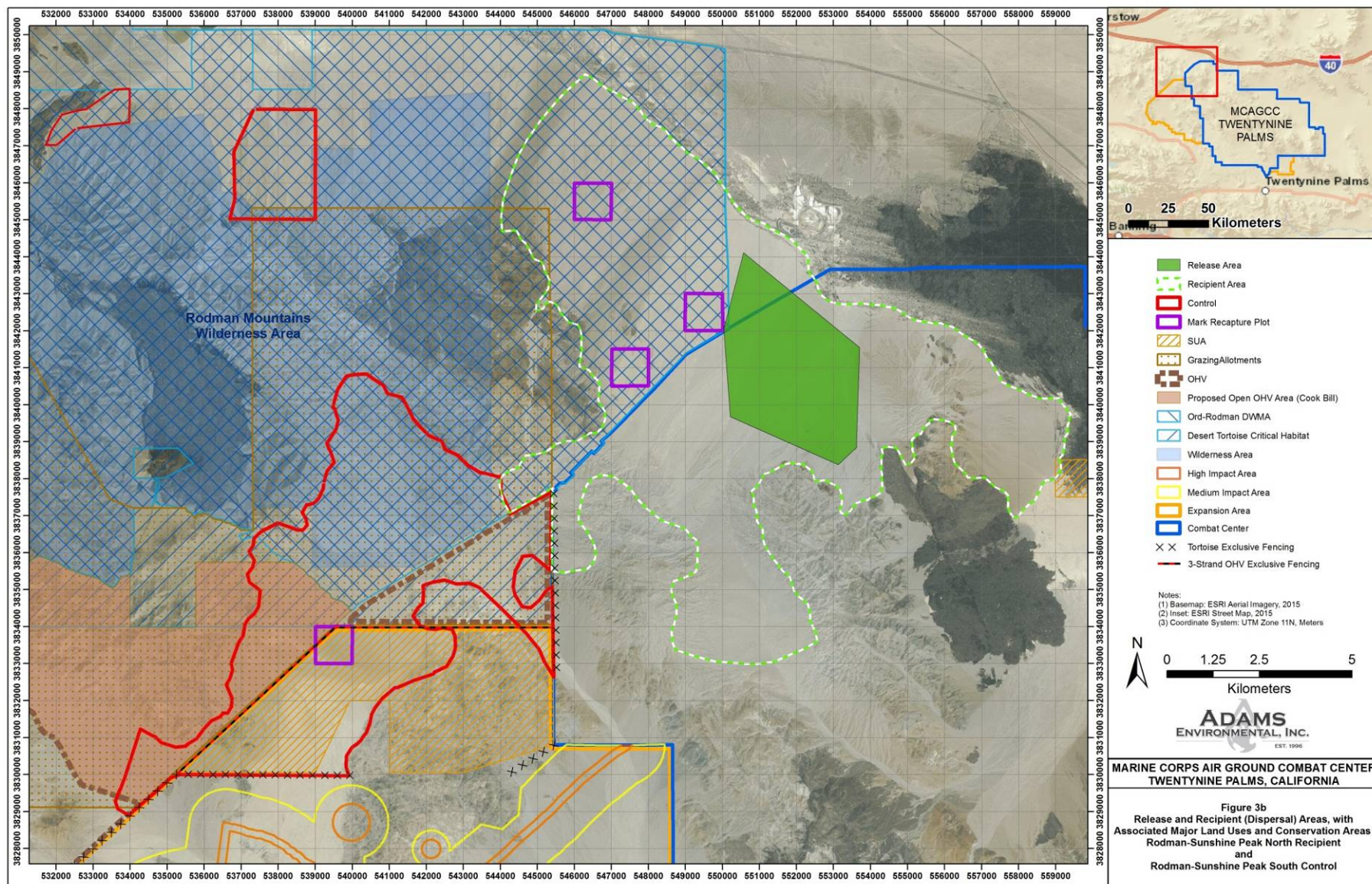
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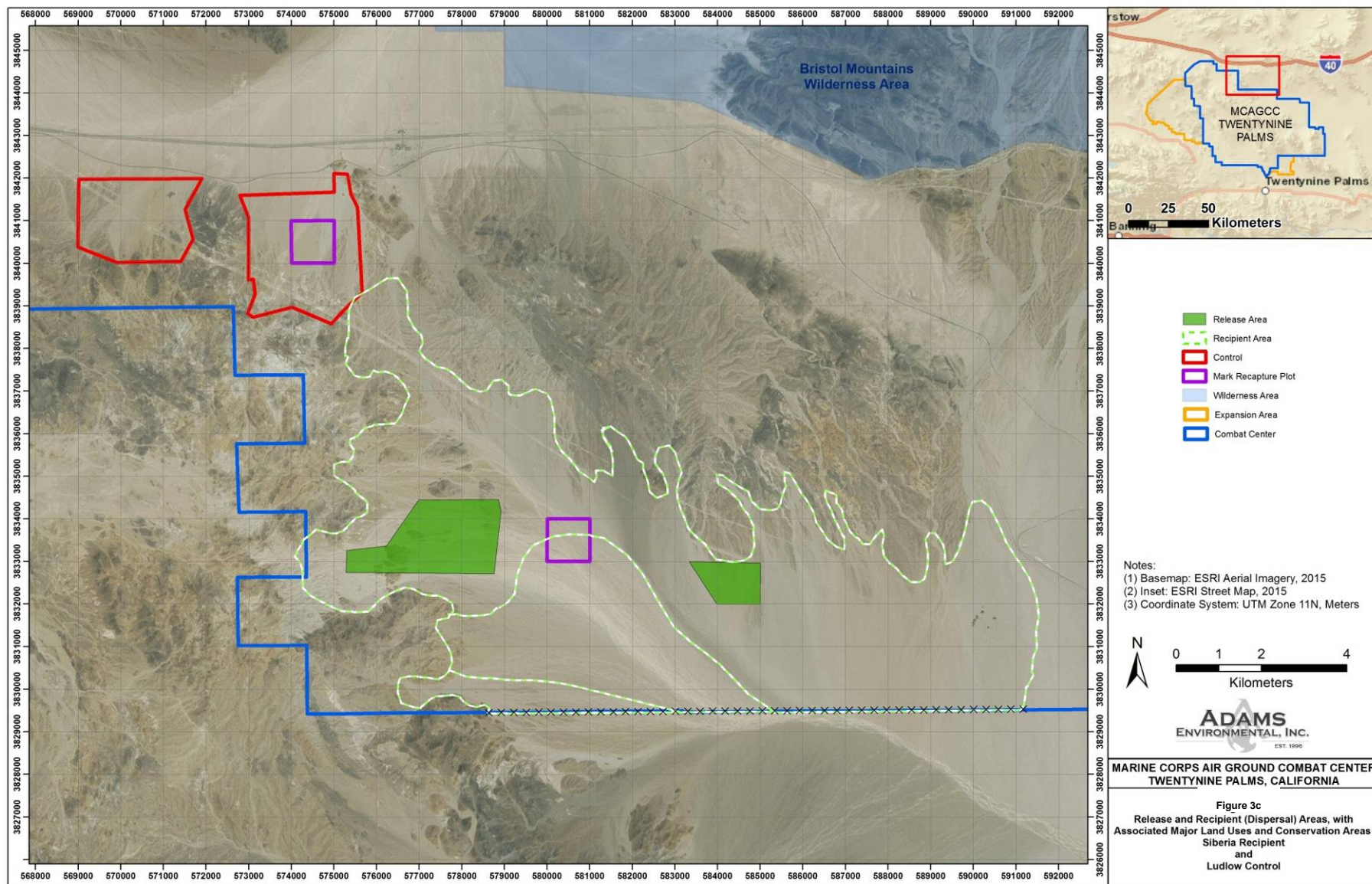


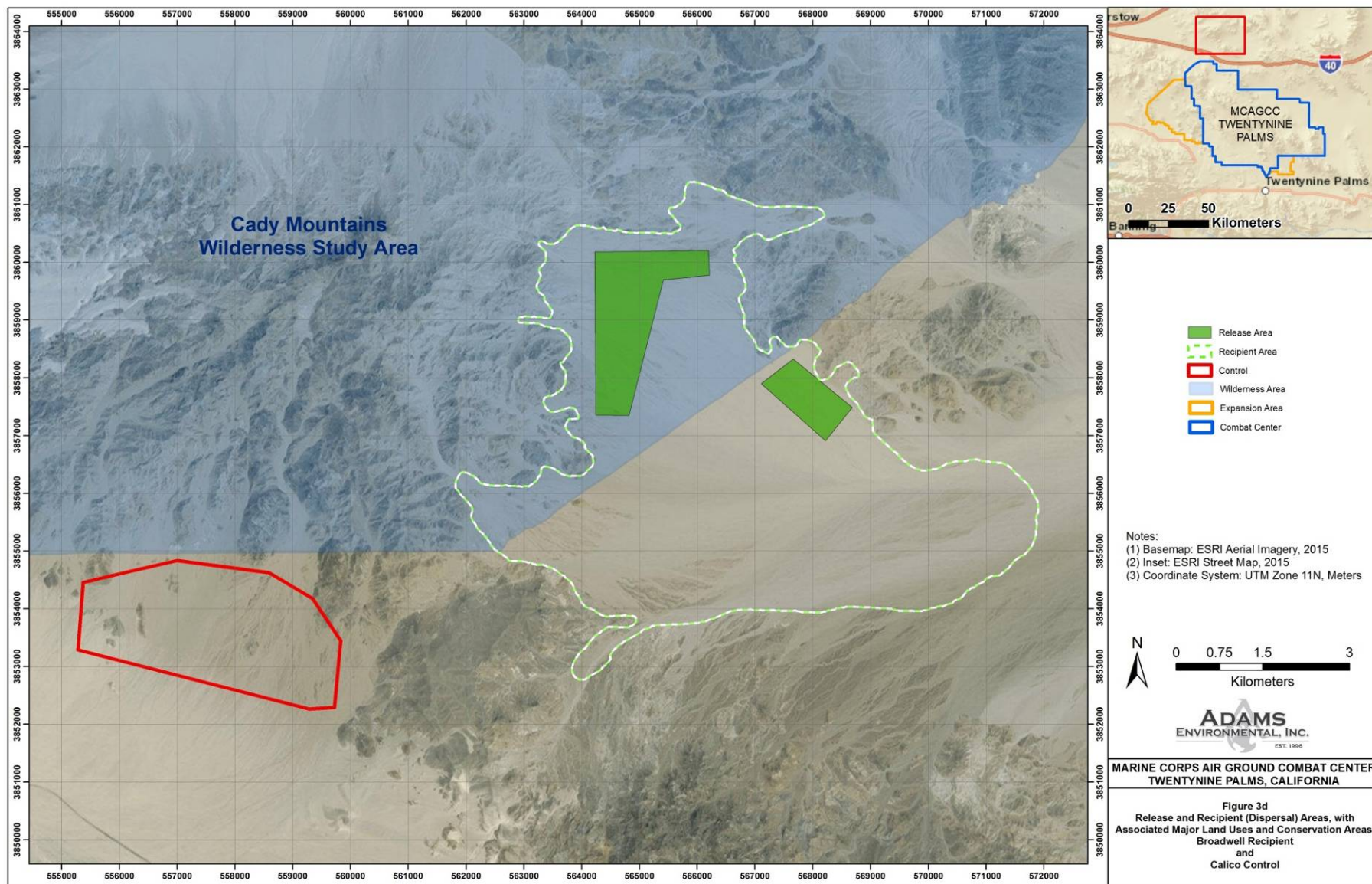


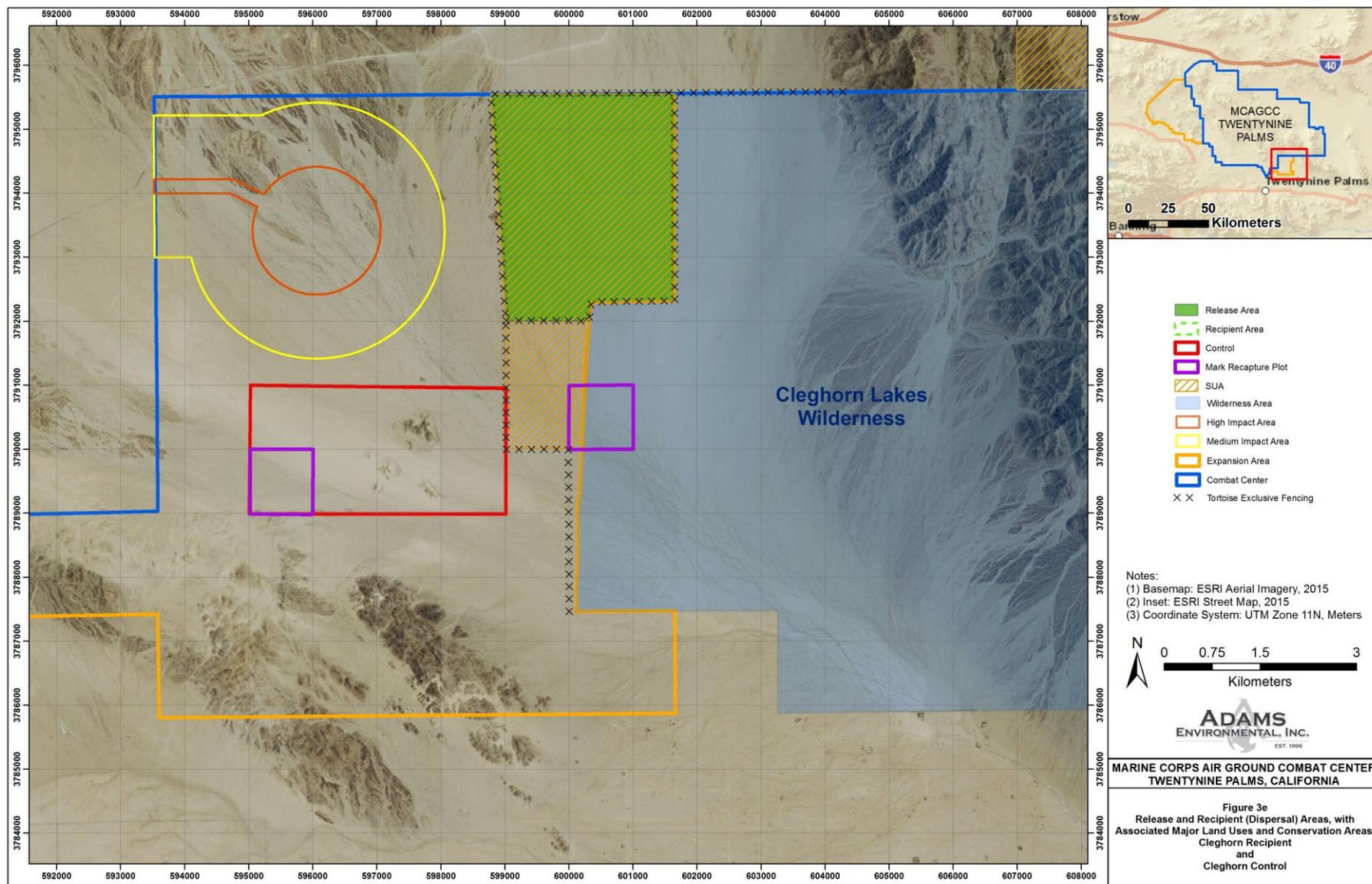


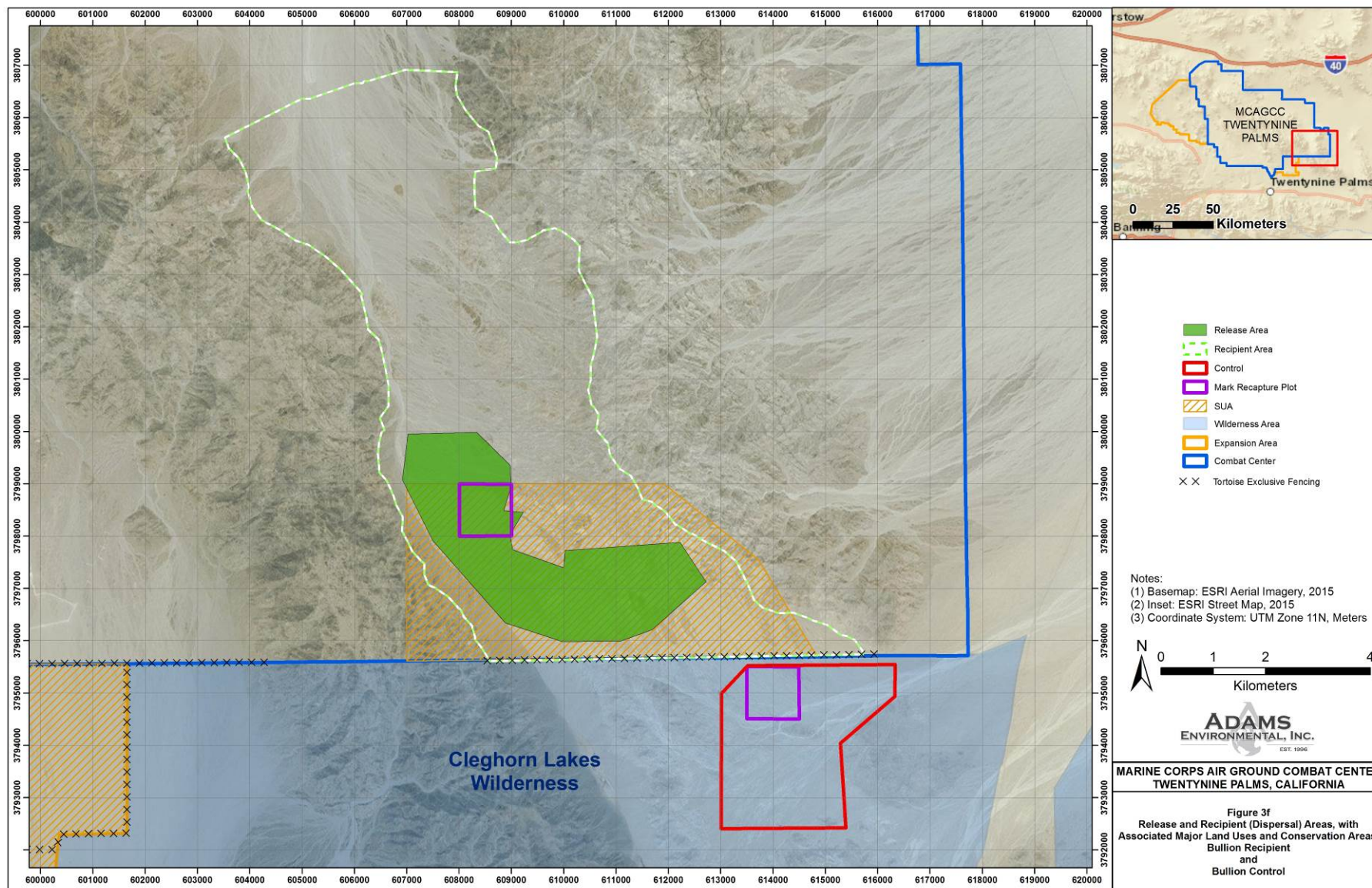


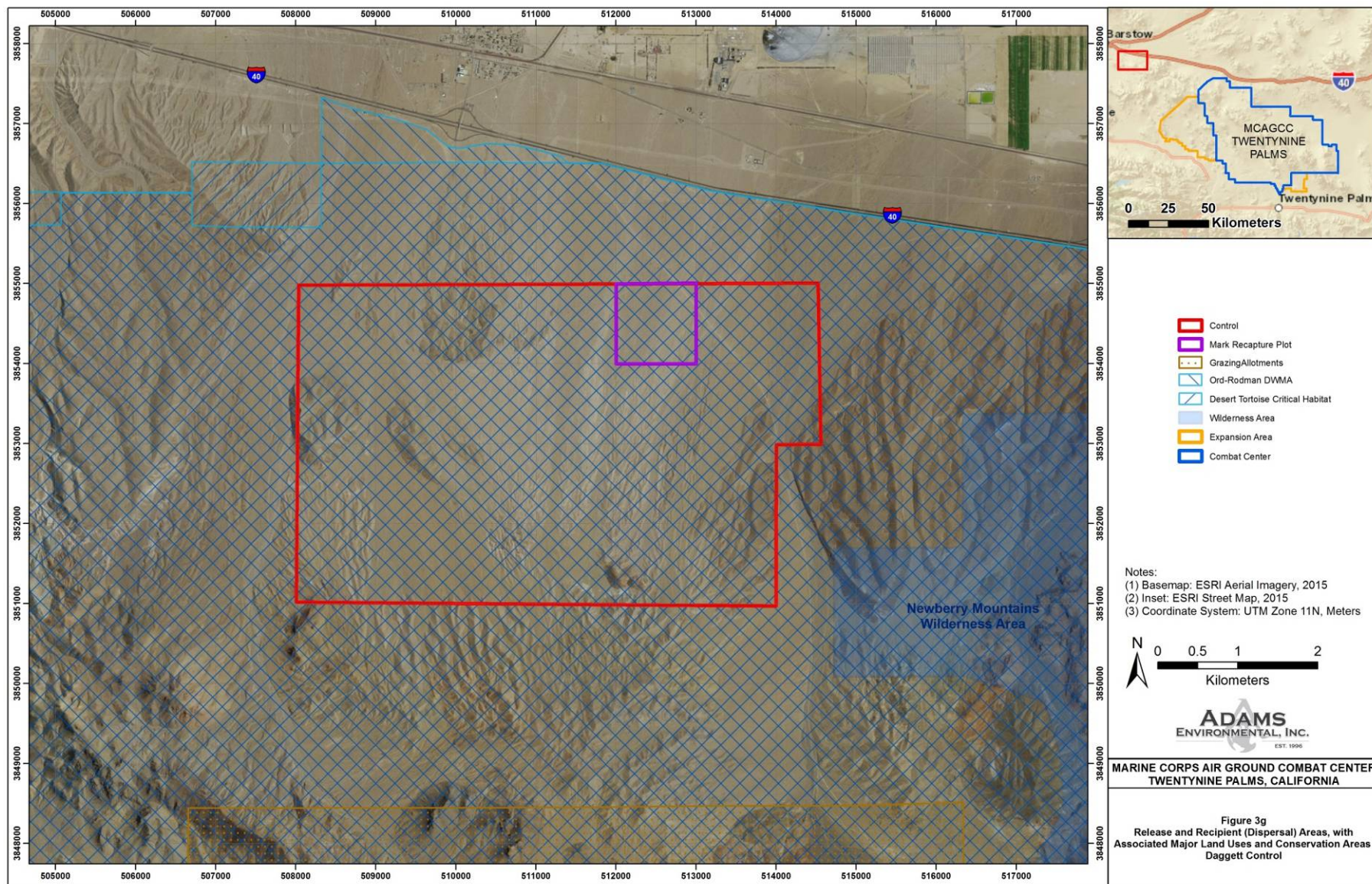












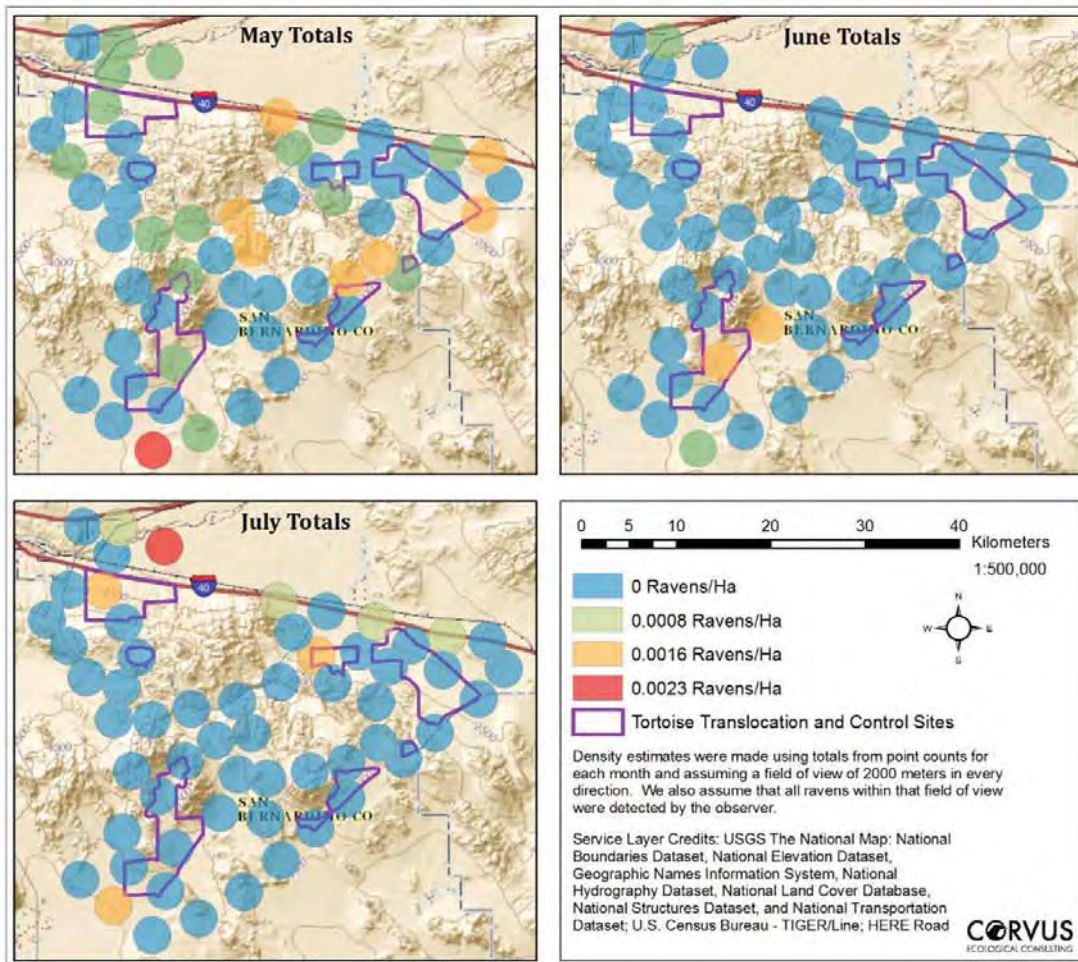
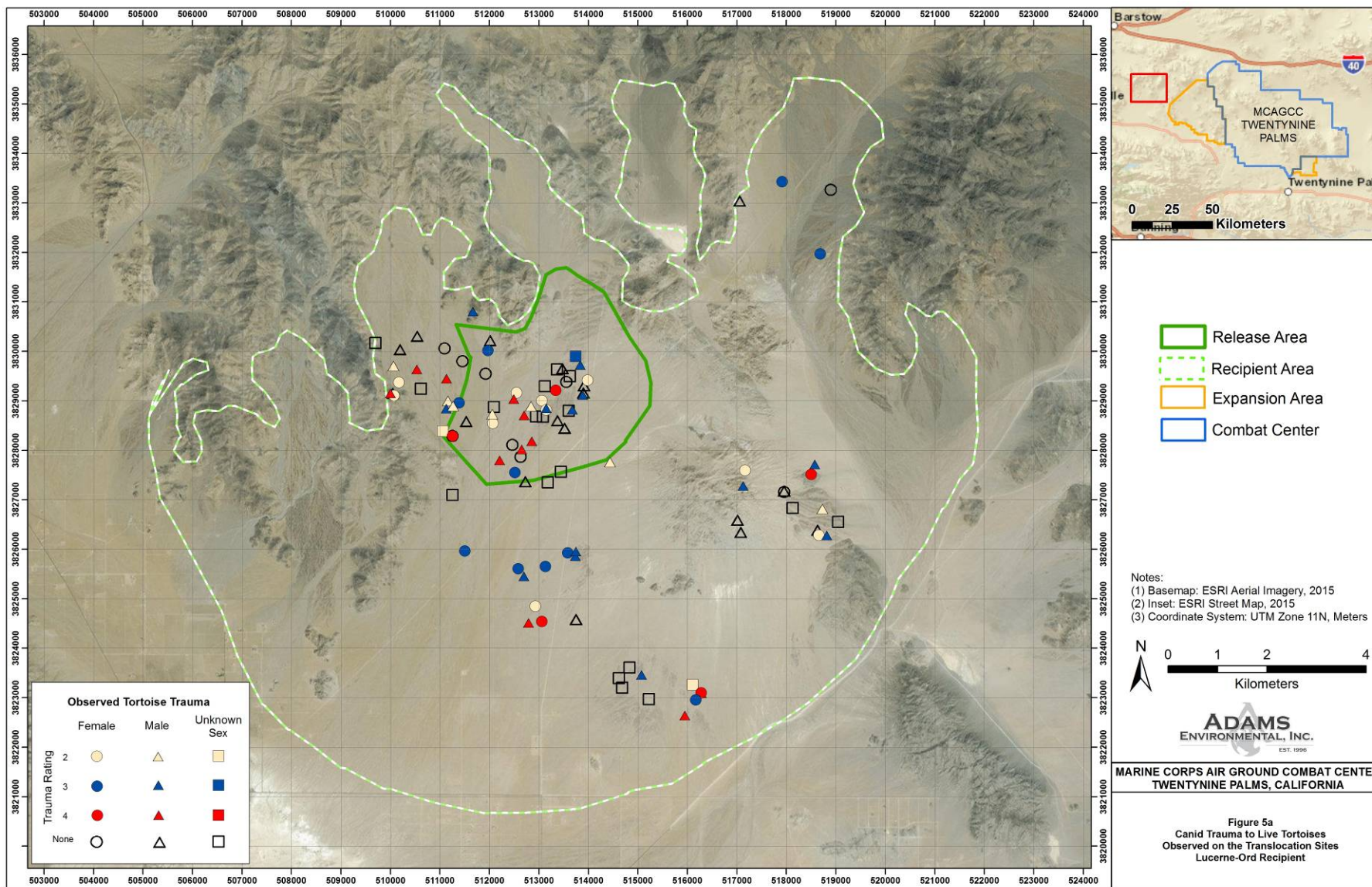
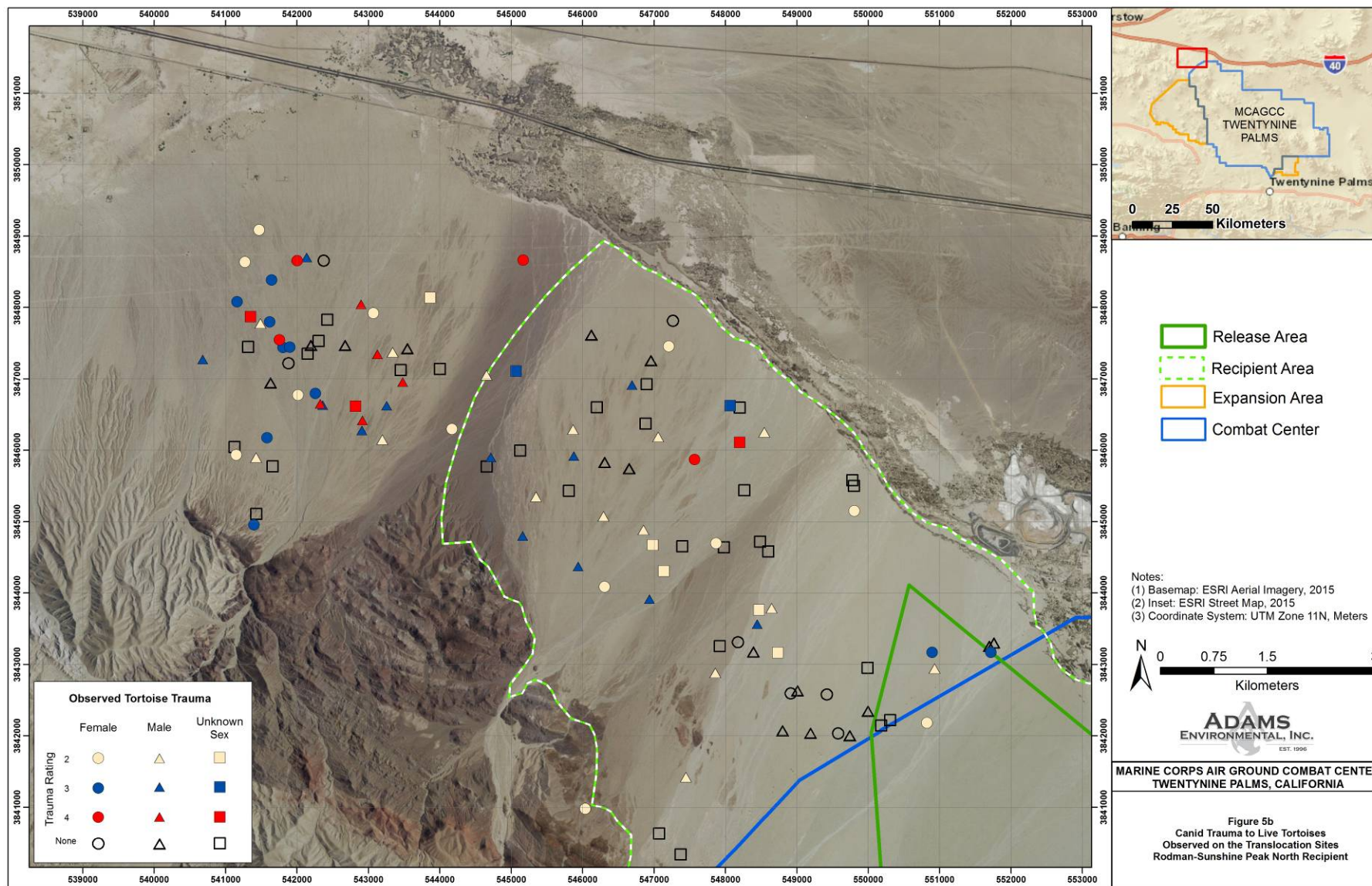
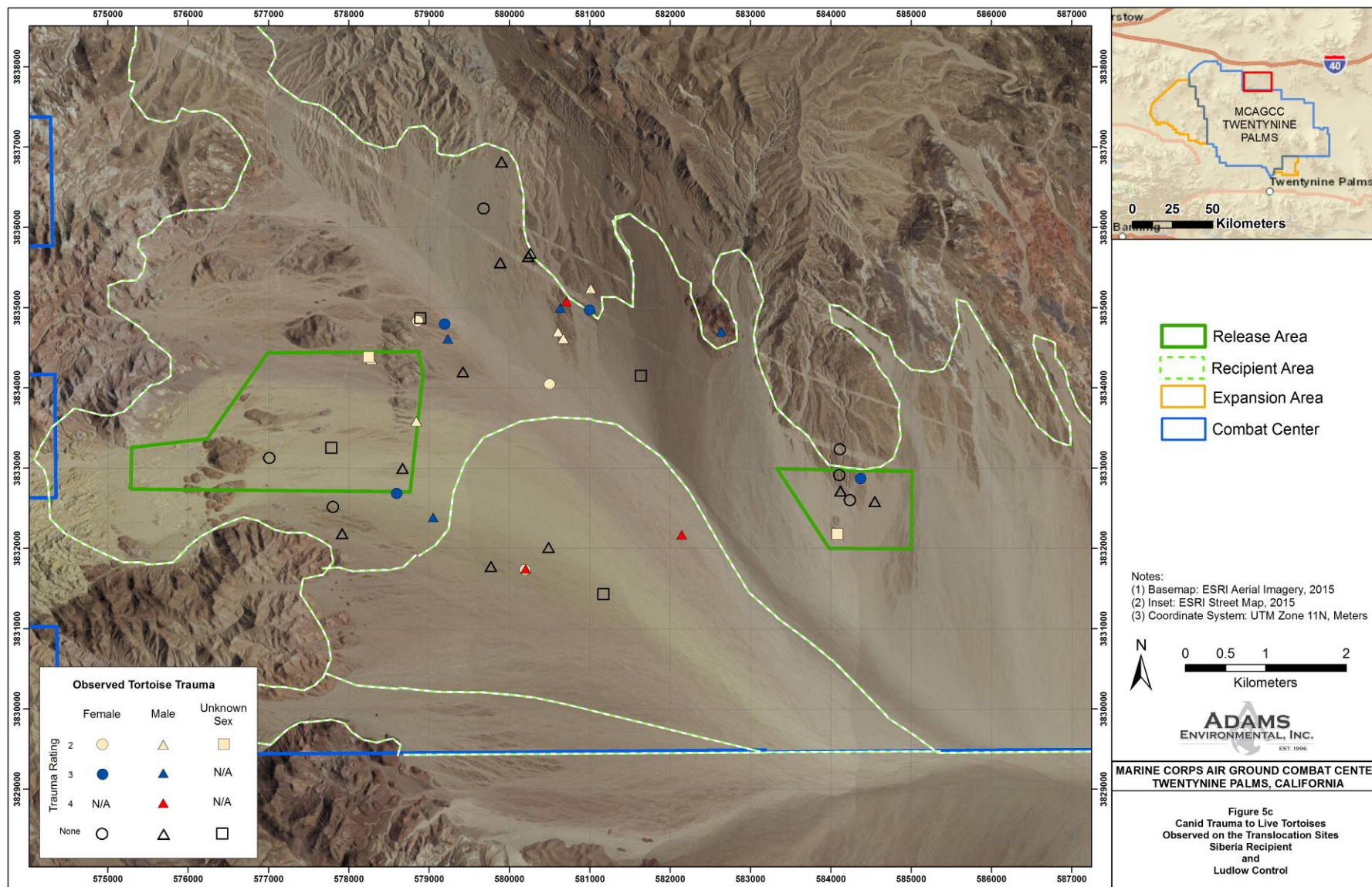
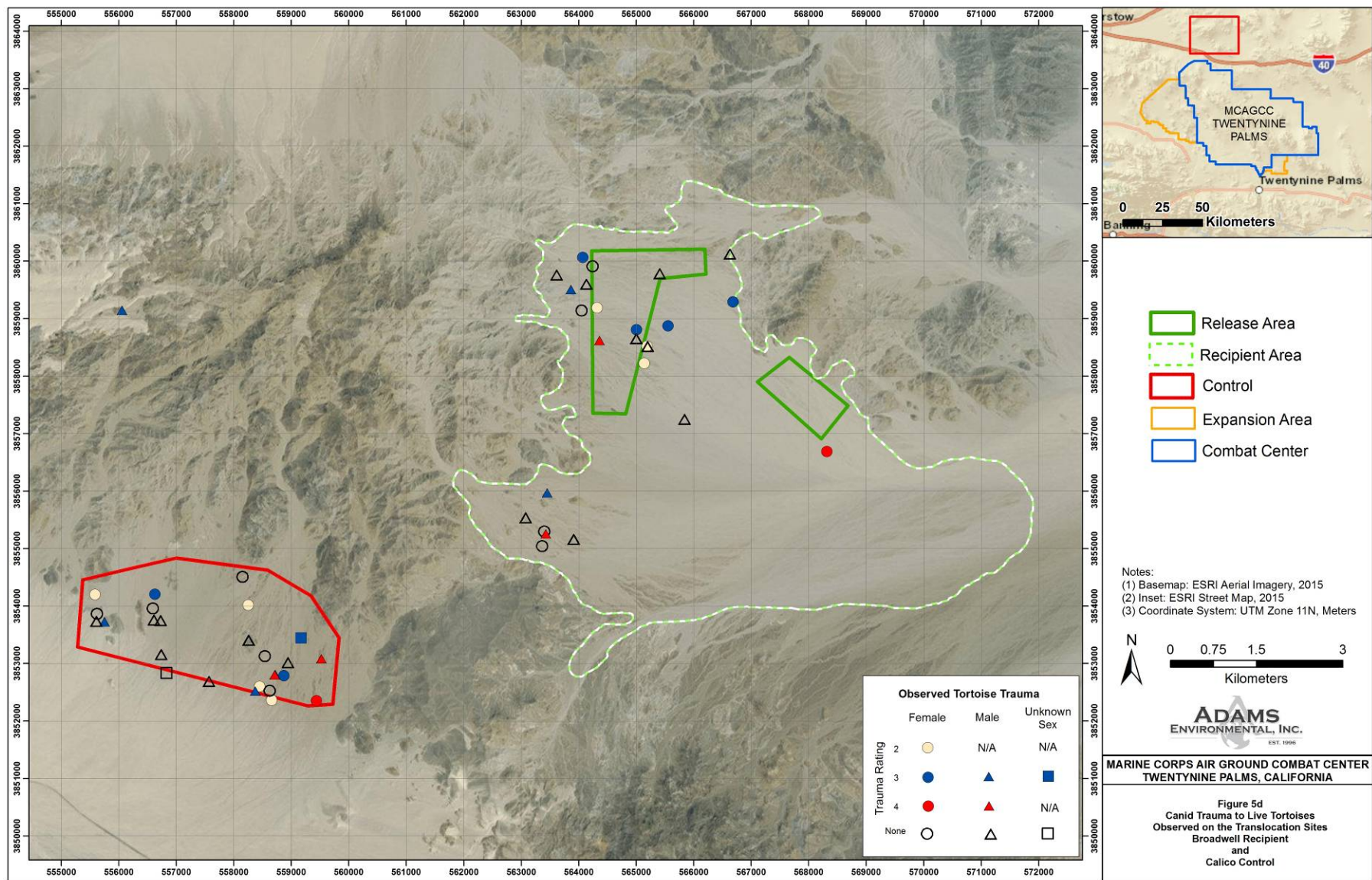


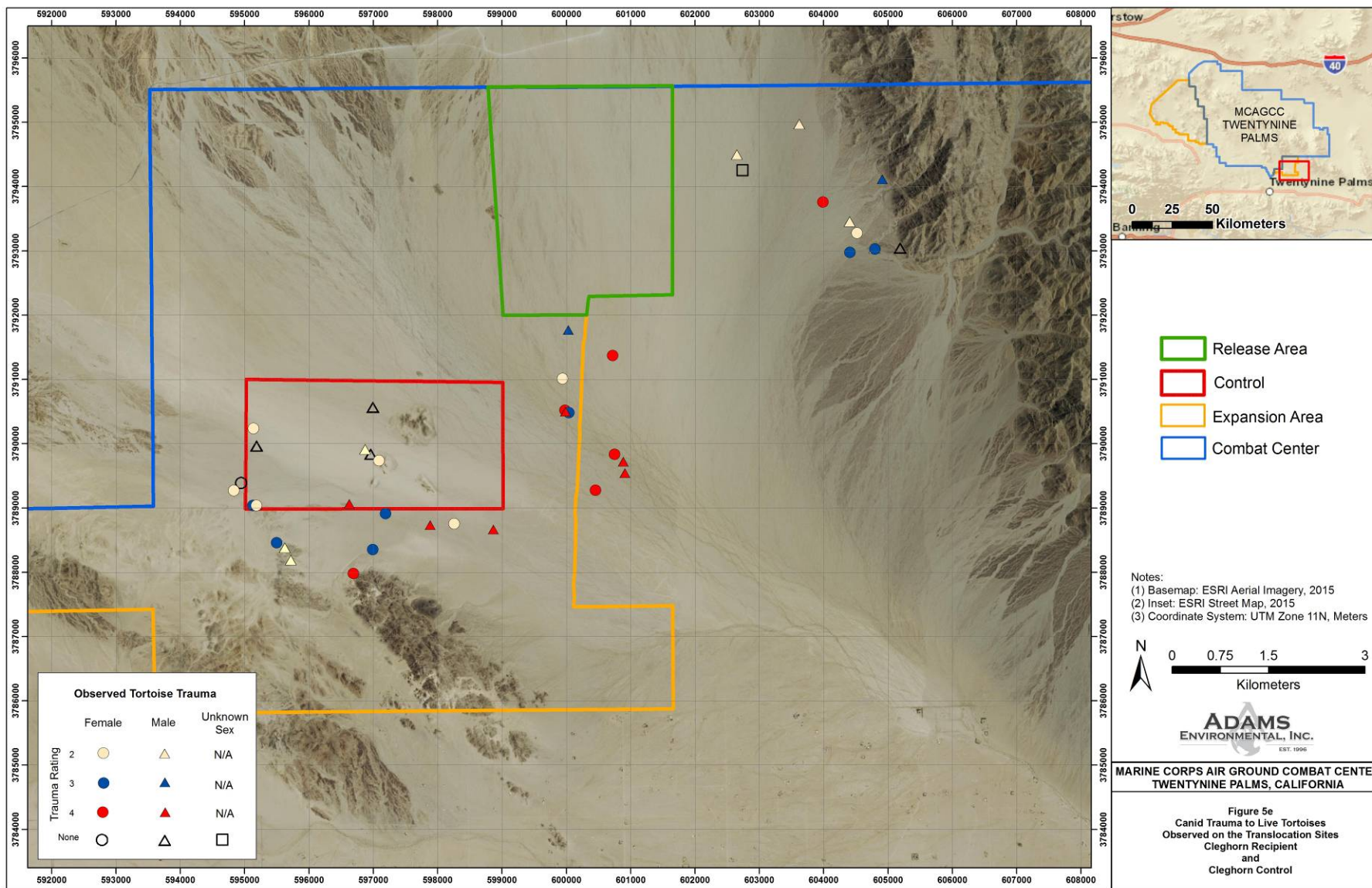
Figure 4. Comparative raven pressure at four translocation sites (purple polygons). Point count totals for three months in Spring and Summer 2015 are shown for Lucerne-Ord Recipient, Rodman-Sunshine Peak North Recipient, Rodman-Sunshine Peak South Control, and Daggett Control. See legend for calculation of raven pressure. Source: Corvus Ecological, unpub. data.

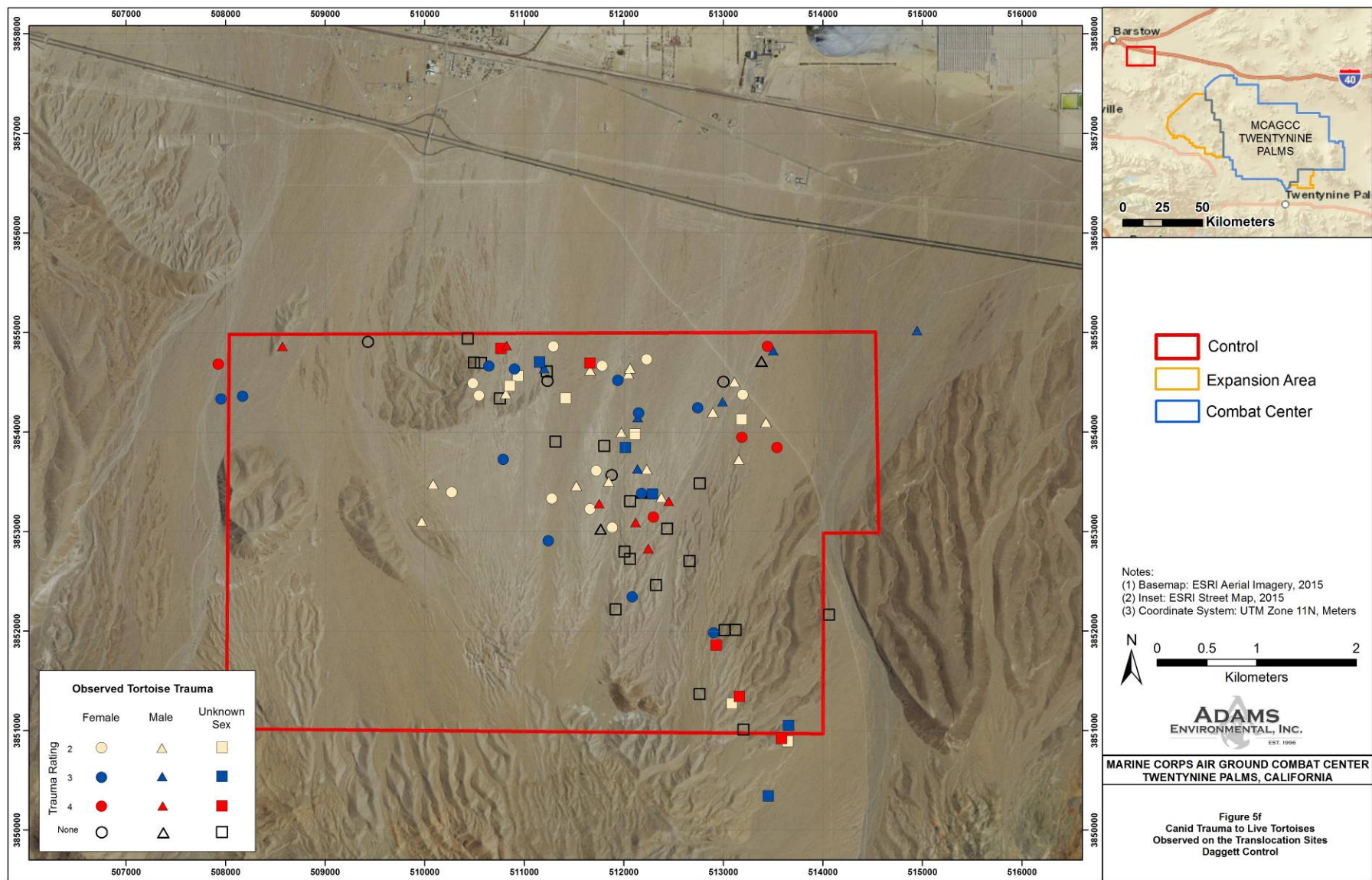


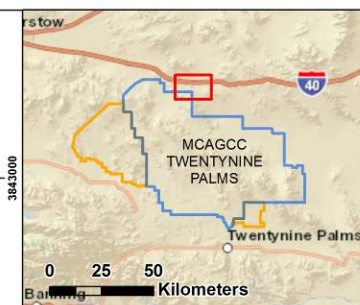
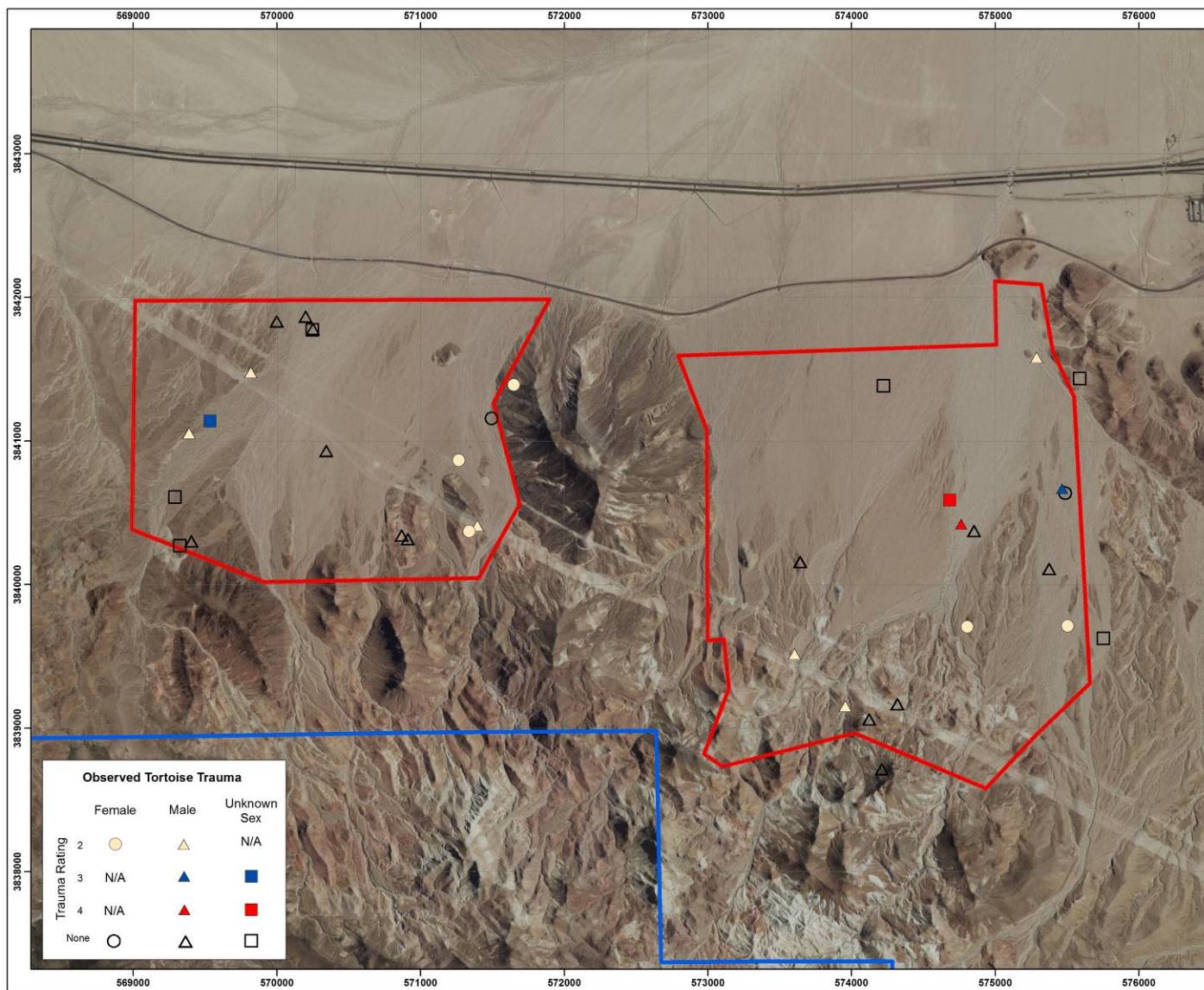






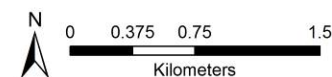






- Control
- Expansion Area
- Combat Center

Notes:
 (1) Basemap: ESRI Aerial Imagery, 2015
 (2) Inset: ESRI Street Map, 2015
 (3) Coordinate System: UTM Zone 11N, Meters



ADAMS
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**MARINE CORPS AIR GROUND COMBAT CENTER
 TWENTYNINE PALMS, CALIFORNIA**

Figure 5g
 Canid Trauma to Live Tortoises
 Observed on the Translocation Sites
 Ludlow Control

APPENDIX A-4
JUNE 2016 TRANSLOCATION PLAN

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**DESERT TORTOISE
TRANSLOCATION PLAN
FOR THE
MARINE CORPS AIR GROUND
COMBAT CENTER
LAND ACQUISITION**

**Natural Resources and Environmental Affairs Division,
Marine Corps Air Ground Combat Center
Twentynine Palms, California 92278**

June 26, 2016

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Attachment 1 - Figures

- Figure 1.** Battalion routes and objectives for the MEB exercises, overlain on tortoise density
- Figure 2.** Recipient and control sites for the Combat Center Expansion
- Figure 3.** Release and Recipient (Dispersal) Areas, with Associated Major Land Uses and Conservation Areas
- Figure 4.** Comparative raven pressure at four sites
- Figure 5.** Canid trauma to live tortoises observed on the sites

DESERT TORTOISE TRANSLOCATION PLAN FOR THE MARINE CORPS AIR GROUND COMBAT CENTER LAND ACQUISITION

1.0 INTRODUCTION

1.1 BACKGROUND

The Marine Corps Air Ground Combat Center ("Combat Center") at Twentynine Palms, California is a unique Marine Corps training installation that provides a realistic battlefield environment for live-fire maneuvers. A large-scale Marine Air Ground Task Force (MAGTF) training area would include areas on the existing Combat Center as well as additional lands west and south of the Combat Center, currently known as the Western Expansion Area (WEA) and the Southern Expansion Area (SEA)¹, respectively. Associated training would enable Marine Expeditionary Brigade (MEB)-level training exercises, involving large-scale, integrated, live-fire maneuvers. MEB training exercises and supporting activities are detailed in the *Biological Assessment for the Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training* (BA; Department of the Navy [Navy] 2011a).

The BA (Navy 2011a) identified that Agassiz's desert tortoise (*Gopherus agassizii*), a federally and state-listed threatened species, is likely to be adversely affected by the proposed land acquisition and airspace establishment action. The US Fish and Wildlife Service (USFWS) issued a biological opinion (BO) in response to the BA (USFWS 2012). Several conservation actions were recommended in the BA, and approved in the BO, among them a plan to translocate tortoises from high & medium impact areas in the WEA and SEA (Figure 1) prior to training exercises. High-intensity battle activity (i.e., that likely to result in high-intensity disturbance) would occur in the more level, gently sloping terrain of the project area. While steeper and rockier areas likely would be subject to less disturbance (typically medium- or low-intensity disturbance), certain vehicles and equipment would be used to fight from covered terrain, such as rocks and reverse slopes of hills that provide cover. Wheeled re-supply and other vehicles would regularly use the Main Supply Routes (MSRs) in the project area during training.

Soil and vegetation necessary for desert tortoise habitat would be expected to be severely degraded or lost in high intensity use areas; and degraded, if not lost, in medium-intensity use areas (Navy 2011a). The proposed action is anticipated to result in major degradation (i.e., complete or nearly complete loss of vegetation and disruption of substrates) of an estimated 4,273 ha (10,559 ac) of occupied desert tortoise habitat in the high-intensity disturbance zone of the study areas. MEB training and MEB Building Block training would also result in a lesser degree of degradation of an estimated 39,067 ha (96,537 ac)

¹The expansion areas were originally called "Study Areas" and "Acquisition Areas". For purposes of this plan, all are now called "Expansion Areas".

of occupied desert tortoise habitat in the medium-intensity training disturbance zone of the project area.

MEB training for 50 years is not compatible with the continued existence of desert tortoises in the high and medium intensity areas. If not translocated, an estimated 1105 adult tortoises and potentially 2100 juveniles would be lost from these zones of the WEA and SEA due to the intensity of training exercises (Navy 2011a). Such a loss of tortoises and tortoise habitat is not compatible with recovery of this threatened species (Navy 2011a). These numbers represent 34% and 23%, respectively, of the adult and juvenile tortoises currently living in the local population. Desert tortoises have experienced long-term and severe declines throughout their geographic range in the past two decades (Karl 2004 and 2010, McLuckie et al. 2006, Boarman et al. 2008, USFWS 2015b). Further losses of over 1000 breeding age tortoises and 2000 smaller tortoises would further compromise species recovery.

In addition, the intensive degradation of over 43,000 ha (100,000 ac) would eliminate that habitat and/or leave it in sufficiently poor quality to render it largely unusable to tortoises. Any surviving tortoises from those areas would need to re-locate to areas with intact habitat that could support them. Since the areas slated for maneuvers in the WEA are in multiple places, tortoises dispersing from the MEB disturbance zones could move into equally dangerous areas. Actively translocating these tortoises to designated locations with suitable habitat that is safe from further anthropogenic degradation, would optimize dispersal.

Translocation is necessary to support the continued existence of this population by maintaining tortoise abundance and genetic integrity. Long-term monitoring of the translocation efforts for this large cohort of tortoises will provide valuable information on translocation efficacy as a tool for species recovery. Studies that can be completed ancillary to translocation will provide important information for recovery methods. Such monitoring and studies are consistent with strategies outlined in the revised desert tortoise Recovery Plan (USFWS 2011a). In particular, the translocation of tortoises to areas with depressed or depleted populations is consistent with Recovery Plan Strategic Element 3. Monitoring survival, disease, habitat, and threats in the studies are consistent with Strategic Element 4. Performing research on translocation effectiveness, constrained dispersal, stocking densities, habitat, and disease are consistent with Strategic Element 5.

1.2 PRE-TRANSLOCATION INVESTIGATIONS AND ACTIVITIES

The BO required that three years of baseline data be collected prior to translocation. Translocation is planned for early Spring 2016, prior to the initial MEB exercises in Summer 2016. This schedule prompted a substantial amount of pre- translocation activities:

- An initial General Translocation Plan (GTP) was developed in December 2011 (Karl and Henen 2011) to provide a basic framework for translocation and further investigations prior to translocation in 2016.

- Recipient and control sites were suggested in the GTP based on a desktop analysis of several factors (e.g., proximity to WEA and SEA, elevation, land uses, long-term protection). Since 2011, these sites have been modified, deleted, and added based on a combined approach of surveys, agency consultation (USFWS, Bureau of Land Management [BLM], and the California Department of Fish and Wildlife [CDFW]), investigations of current and future land uses, and examination of data from other projects originally targeted for those sites.
- Beginning in 2012 and ongoing, field surveys have been performed to examine translocation-associated factors in both the impact areas and the recipient and control sites. These factors include:

Tortoise Density

- ◊ Mark-recapture – Established 6 new, 1 km², mark-recapture plots in the WEA (3) and nearby translocation area (3) in 2013; established an additional 8 plots in translocation areas in 2015.
- ◊ Tortoise Regional Estimate of Density (TRED) transects (Karl 2002) in the WEA and SEA (2012) and translocation areas (2013-2015).

Habitat Analyses

- ◊ Qualitative and quantitative transects in the WEA, SEA, and translocation areas, 2012-2015.

Baseline Disease Status and Behavior

- ◊ Health assessments, with tissue sampling, on 359 tortoises in two translocation areas and the impact areas, Fall 2013 and Spring 2014.
- ◊ Attached transmitters to 114 tortoises in two translocation areas and the impact areas, Fall 2013 and Spring 2014; tortoises tracked monthly after initial two weeks of heightened tracking.

Predation

- ◊ Focused raven abundance and nest surveys in the translocation area, Spring 2014 (pilot study) and Spring 2015, continuing.
- ◊ Canid-related trauma - analysis from health assessments on recipient and control sites, 2015 surveys.

Genetics Analysis

- ◊ Assessment of genetic differentiation among the impact and translocation areas, using a subset of 135 samples from the impact areas and disparate recipient and control sites.

- We completed tortoise clearance surveys on over 205 km² comprising the WEA and SEA high and medium impact areas, from September 2014 through October 2015. In brief, clearance surveys coincided with heightened tortoise activity in spring and fall to maximize the probability of finding all tortoises. Two complete passes were walked, with transects spaced at five-meter intervals; the second pass was walked perpendicular to the first to maximize observing all surfaces. Teams were limited to five people for maximum search

efficiency, with the central navigator following designated coordinate lines (“UTMs”) to ensure complete coverage of the survey area. Recent tortoise sign was mapped and qualified relative to size and age to assist in finding every tortoise associated with fresh sign; additional, concentrated surveys occurred where no tortoise was initially found near any fresh sign. Similarly, when new hatchlings were found, a concentrated search was employed to find other hatchlings from the clutch.

All tortoises of adequate size were transmittered; juvenile tortoises too small to wear transmitters were moved to new holding pens at Natural Resources and Environmental Affairs Division’s (NREA’s) Tortoise Research and Captive Rearing Site (TRACRS). *In situ* monitoring of all tortoises with transmitters was accomplished by monthly tracking, following an initial two-week period of intensive tracking after transmitter attachment. We conducted health assessments on all tortoises per USFWS current guidelines (USFWS 2015a; see Section 6.3, below, for details of these techniques.)

To help understand mortality rates, we recorded each tortoise shell remain that was sufficiently complete to represent a single tortoise. Each shell was sexed, sized, and aged relative to time since death, and the cause of death was recorded, if determined.

- Holding pens with 186 individual units were built in 2015. These were constructed at the TRACRS headstarting facility to resemble the existing pens.
- Tortoises were sought on the recipient and control sites in Fall 2015 to transmitter resident and control tortoises. We used standardized, 10 meter-wide transects throughout most of each site to sample representative habitats that would be occupied by translocatees and residents, adding focused searches in better habitats. Shell remains were recorded as for clearance surveys. We performed health assessments on all transmittered tortoises, plus additional tortoises encountered to augment our knowledge of each site’s disease status.

This final plan incorporates these additional data and analyses, as well as collaboration with the resource agencies.

2.0 IMPACT AREA BASELINE DATA

2.1 NUMBER OF TORTOISES TO BE TRANSLOCATED

We found 1,410 tortoises during clearance surveys of government lands in the WEA and SEA, of which 1,175 adult and juvenile tortoises were transmittered and an additional 235 smaller tortoises were transferred to TRACRS holding pens (Table 1). Private lands within the WEA that are still in negotiation should provide approximately 18 additional

tortoises. Subtracting lost tortoises due to inactive transmitters and mortality, the Combat Center anticipates translocating 1,138 transmitters next spring, plus juveniles from the holding pens that have grown large enough to avoid raven predation.

The BO (USFWS 2012) requires the Combat Center to perform subsequent clearance surveys on any square kilometer where at least three tortoises were found on the previous survey. Estimates of survey efficacy (Karl 2002) combined with findings from previous surveys suggest that another 104 adult and juvenile tortoises will be found in these subsequent surveys. After five years, we estimate that the cumulative total of tortoises to be translocated will approximately equal 1,495 tortoises, including 998 tortoises ≥ 160 mm in carapace length (MCL) and 497 smaller tortoises (Table 1).

Table 1. Cumulative number of tortoises expected to be translocated from the impact areas, including those already found (Found) and those anticipated from future clearances (Additional). MCL=Midline Carapace Length.

Tortoises	≥ 160 mm MCL			<160 mm MCL	
	Male	Female	Unknown Sex	Transmitted	Holding Pens
Found:					
WEA	457	334	43	218	235
SEA	<u>41</u>	<u>40</u>	<u>1</u>	<u>4</u>	<u>0</u>
<i>Subtotal</i>	498	374	44	222	235
Total for Size Group	916			457	
Additional:					
13 km ² of Private Lands		12		6	
Subsequent Annual Clearances ¹		70		34	
Total	998			497	

¹ The number of tortoises estimated for subsequent annual surveys is based on finding 74% of the tortoises present on each pass (Karl 2002), or 93% cumulatively after two passes.

The actual number of tortoises ultimately found may exceed estimates, which are based on density inside the impact area. Our surveys capture not only tortoises that may live primarily inside the impact area, but those outside whose home ranges overlap the impact area. Based on a 720 m home range diameter (TRW 1999), any male tortoise within 720 m of the impact area could be captured. The large edge-to-interior ratio of the battalion routes, especially, but also the boundary of the main objectives, increases the possibility that additional tortoises will be captured.

3.0 RECIPIENT AND CONTROL SITES

3.1 SITE CHOICE AND CRITERIA

Recipient and control sites were identified and refined relative to size and location following the three-year program of surveys, literature review, and discussions with the resource agencies and stakeholders. The final number of tortoises found during the clearance surveys further dictated the number and sizes of the sites.

Recipient areas must meet several important criteria to ensure that translocation will successfully support tortoise recovery:

- Sites should be part of a connected system of occupied desert tortoise habitat.
- Tortoise populations on and/or near the recipient areas are depleted or depressed, so that translocation augments a site and does not conflict with carrying capacity constraints.
- The lands must comprise sufficiently good habitat that they are either currently occupied or could be occupied by the desert tortoise. Habitat on the recipient areas must be suitable for all life stages.
- Sites that are protected or receive adequate protection.
- Lands should not be subject to elevated threats (e.g., predation, disease, exotic invasive plant species) or intensive historic, current or future land uses (e.g., recreational use, development, habitat degradation) that could compromise habitat recovery or render it too lengthy to be useful during the initial translocation years. These considerations also must extend to surrounding lands onto which tortoises might disperse.

These criteria are consistent with the goals, objectives, and recovery strategies of the Recovery Plan USFWS (2011a) and USFWS translocation guidance (USFWS 2011b). The latter further requires that:

- Disease prevalence within the resident desert tortoise population is less than 20 percent.
- Recipient sites should be within 40 km of the impact area, with no natural barriers to movement between them, to ensure that the desert tortoises at the two sites were likely part of a larger mixing population and similar genetically.
- Release sites must be at least 10 km from major unfenced roads or highways.
- Recipient areas include a dispersal radius of 6.5 km from release points.

In addition, the recipient sites are generally consistent with draft translocation guidance under review by USFWS. These guidance criteria include the following additional measures:

- Release sites support habitat suitable for all desert tortoise life stages.
- There is no evidence of an active outbreak of disease, such as high prevalence of clinical signs of disease or seropositive responses² to disease agents.
- Major, unfenced roads or highways are no closer than 6.5 km to the release site.
- The site has no detrimental rights-of-way or other encumbrances.
- The site will be managed compatibly with continued desert tortoise occupancy.

USFWS (2011b) recommends that post-translocation densities of adult tortoises not exceed one standard deviation (SD) of the most current density in the recovery unit. For the Combat Center, the mean Western Mojave Recovery Unit density is 2.8 adult tortoises/km² (USFWS 2015b), which translates to a post-translocation maximum of 3.7³, an increase of 0.9 tortoises/km². Thus, translocating 998 adults (Table 1) would require 1108 km².

Beyond the basic criteria for recipient sites that will optimize translocation, there are additional considerations pertaining to monitoring and research that are critical components for evaluating the success of the translocation program:

- Replicates, both among sites and individuals, are crucial for statistically examining translocation effects.
- Control sites must be similar to recipient sites (habitat type/quality, post-translocation population density, and disease status), but not influenced by translocation to recipient sites. USFWS (2011b) recommends a separation distance of approximately 10 km (6.25 mi).
- Control sites must not have foreseeable development or other impacts precluding tortoise occupancy.
- Experimental sites must be sufficiently separated to avoid co-interference.
- The intensive tracking schedule required by USFWS (2011b, 2012) requires that individuals be found virtually weekly throughout the year, largely because translocatees travel erratically and unpredictably and can be lost easily. The tracking requirements for Year 1 are:

Within 24 h of release
Twice weekly for first two weeks
Weekly from March through early November
Twice monthly from November through February

² The Combat Center considers seropositive response to be an indication of past exposure, and does not necessarily indicate an active outbreak.

³ Note, however, this population density is less than the minimally viable population density of 3.86 adult tortoises/km² (USFWS 2016a). Draft translocation guidance under review by USFWS identifies a new target of 4.3 tortoises/km² in the Ord-Rodman CHU.

Years 2-5 are only slightly less intense. Accordingly, access to transmitted individuals must be continuous. Because range access on the Combat Center is highly restricted due to training exercises, transmitted animals cannot be released on the Combat Center without considering alternative tracking schedules and other monitoring efforts. For the Sunshine Peak portion of the Rodman-Sunshine Peak dispersal area, the Combat Center will implement a combination of occasional radiotracking combined with multiple line transects to span most of the Sunshine Peak Training Area (Section 4.1.1).

3.2 RECIPIENT AND CONTROL SITE SELECTION

Five recipient areas and six control sites were designated (Figure 2). Recipient areas include both a release area and a dispersal area. Each recipient area is paired with a control site(s) to match genetics, habitat and local weather patterns.

Generally speaking, recipient areas meet the criteria listed in Section 3.1, above. None is more than 40 km from the impact areas (Table 2), although they are up to 53 km from the furthest edge of the relevant impact area. These distances are much less than the conservative 200 km recommended physical limit before incurring risk of outbreeding depression (Averill-Murray & Hagerty 2014).

Tortoise populations have declined severely throughout their geographic range (Karl 2004 and 2010, McLuckie et al. 2006, Boarman et al. 2008, USFWS 2011a, 2015b). By contrast, no regional increase in tortoise density near the Combat Center has been documented. In the Combat Center area, specific tortoise declines have been documented on several sites:

- The Emerson Lake, Sand Hill and Bullion training ranges adjacent to the impact areas - Numbers of live tortoises at the Emerson Lake Plot declined from consistent levels of 15 to 20 tortoises/km² on three surveys between 1997 and 2003 to 3.0 tortoises/km² in 2009 (Kiva 2009). The Sand Hill permanent study plot (Plot #2) plot declined from 37.8 to 10.4 tortoises/km² between 1991 and 2008 (Kiva 2008) and to 3 tortoises/km² in 2013 (A.P. Woodman, unpubl. data). The Bullion plot had 31 and 42 tortoises/km² in 2001 and 2003, respectively (Kiva 2007, unpub. data) and 15 tortoises/km² in 2015 (clearance data).
- The BLM's Johnson Valley long-term study plot declined from 69 tortoises/km² in 1980 to 6 tortoises/km² in 1992 (Berry 1996 in BLM 2005).
- USFWS' line distance sampling program has recorded continuous declines in the Ord-Rodman sampling stratum, from 8.2 to 3.6 tortoises/km² between 2007 and 2015 (USFWS 2009b, 2015b).

This translocation effort prioritizes recipient sites that result in augmentation of depleted populations. Draft translocation guidance defines depleted populations as areas where tortoise densities are estimated to decline to a minimally-viable level of 3.86 adult tortoises/km² within three years based on trends estimated by USFWS (2016a).

Recipient sites for the Combat Center translocation are generally depleted or on the cusp of depletion (Table 6).

The Combat Center considered habitat quality (Section 3.3) and the latest Translocation Guidance (USFWS 2016a) when determining post-translocation density for each recipient site (Table 6). We paired the treatment of Lucerne-Ord to Rodman-Sunshine Peak North and Broadwell to Siberia as these pairs had similar quality of habitat. This simplifies the number of categories of post-translocation density, and should improve analytical power in data analyses. Draft USFWS translocation guidance (USFWS 2016a) defines a depleted population as those expected to have densities < 3.86 adult tortoises per km^2 in the next three years (by populations trends; USFWS 2016a). This criterion was used in our treatment calculations, with treatments being 40% or 105% increases above the criterion. The greater increases correspond to the sites with better quality habitat. The Cleghorn Lakes site is experimental, with a temporary fence to encourage translocatees to settle during a two-year period before the fence is removed (Karl 2007). The post-translocation density for Cleghorn Lakes will match the current density at the Bullion site, which is nearby (ca. 6 km) and will serve as a control for the Cleghorn Lakes experiment.

Tortoise densities (Table 6) and habitat quality (Section 3.3) vary considerably among sites, with higher tortoise densities corresponding to higher habitat quality. A recent habitat model (Barrows et al 2016) shares this general pattern for the control and recipient sites within the model boundaries. The model corresponds better with higher quality habitat, though less suitable habitat per the model can support low tortoise densities yet fall below the model's lower threshold for suitability. The modelled 3°C increase in ambient temperature correlates to decreased precipitation or increased aridity (Barrows et al. 2016) and indicated 55% less area of suitable habitat given warming, but 40% of the area being refugia (suitable currently and in the future). Drought during the past five years probably contributed to elevated mortality in the Rodman-Sunshine Peak area (Section 3.3.1) and likely other sites (e.g., Siberia) since the drought was not localized or limited to one year.

The habitat projections modelled can be interpreted for recipient sites and control sites captured within the boundaries of the model (Broadwell and Daggett were not captured). No sites increased in total area of suitable habitat given the climate change (warming or aridity). The sites containing mostly refugia or new habitat given climate change included two large recipient sites (Lucerne-Ord, Rodman-Sunshine Peak-N) and two large control sites (Bullion and Rodman-Sunshine Peak South). Siberia is anticipated to have much less area that is suitable and about 5% refugia, although adjacent lands will have refugia or new habitat. The Cleghorn projection showed a similar pattern, although the model did not capture well the suitability of Cleghorn; despite records and calibration points in Cleghorn, it fell below the model's threshold for suitability before and after warming. This site is and will be near suitable habitat in MCAGCC's Cleghorn Pass Training Area. Three control sites (Calico, Ludlow and Cleghorn) will lose considerable suitable habitat but may have some refugia or new habitat nearby.

Table 2. Relationship of impact, recipient (R) and control (C) sites. Each recipient area is paired with one or more control sites. The natural and artificial features that separate the recipient and control sites from the impact areas and separate the paired sites are listed. Mountains that are impermeable to tortoises are considered to be barriers. Permeable but difficult terrain is considered a deterrent.

Site	Size (km ²) ¹	Separation from Impact Area		Paired Site	Paired Site		Number of Mark- Recapture Plots
		Distance from Impact (km) ²	Other Separation Factors		Distance from Paired Site (km) ³	Other Separation Factors	
Recipient				Control			
Rodman Sunshine Peak N	103.4	6.9	low mountains (a deterrent, not a barrier)	Rodman Sunshine Peak S	6.5	low mountains (a deterrent, not a barrier)	3
				Daggett	38	Newberry Mountains (barrier), residential development, poor (playa) habitat	
Lucerne-Ord	162.5	12.5	Fry Mountains (barrier)	Rodman Sunshine Peak S		Fry Mountains (low; a deterrent, not barrier)	1
				Daggett	23	Ord Mountains (barrier)	
Broadwell	52.4	28.5	broad lava flow (barrier), freeway, poor habitat	Calico	3.3	Cady Mountains (low; a deterrent, not a barrier)	
Siberia	63.8	27.8	Combat Center, several mountain ranges	Ludlow	5.8	low mountains (a deterrent, not a barrier)	1
Cleghorn Recipient	8.1	1	tortoise exclusion fence	Cleghorn Control	3.0	tortoise exclusion fence	1
				Bullion (C)	5.6	tortoise exclusion fence; Bullion Mts	1

Control				Recipient			
Rodman Sunshine Peak S	54	0.5	tortoise exclusion fence	Rodman Sunshine Peak N, Lucerne-Ord	---	---	1
Daggett	22	31.6	Rodman and Newberry Mountains (barrier)	Rodman Sunshine Peak N, Lucerne-Ord	---	---	1
Calico	16.7	23.3	broad lava flow (barrier), freeway, poor habitat	Broadwell	---	---	
Ludlow	11	27.9	Combat Center, several mountain ranges	Siberia	---	---	1
Cleghorn (C)	9.5	1.7	No barrier, although localized topographic features (incised washes, low hills) on control site probably encourage tortoises to remain locally	Cleghorn (R)	---	---	1
Bullion (C)	12	15.7	Bullion Mts; tortoise exclusion fence	Cleghorn (R)	---	---	1

1. For Recipient sites, this is the size of the release and dispersal area (=recipient area). For control sites, it is the approximate study area size.

2. Distance is from nearest edge of the impact area.

3. Distance is from edge of the release area

3.3 DESCRIPTIONS OF THE RECIPIENT AND CONTROL SITES

Specific characteristics of each recipient site, and issues related to translocation, are discussed below. Control sites have been included to demonstrate that they have essentially the same conditions as the paired recipient sites, and have adequate conditions to support a long-term study (e.g., conservation areas). Land uses and long-term protection⁴ are detailed in Table 3 and Figures 2 and 3. We evaluated specific mortality factors at each site (Table 4, Figures 4 and 5) that included disease and predation. Because many of these data were collected this fall, the analysis has not been completed; accordingly, the results we present here are preliminary. Using data on the shells found during tortoise searches, we assessed mortality rates for the last four years for adult tortoises (≥ 180 mm in carapace length [MCL]). Enzyme-Linked ImmunoSorbent Assay (ELISA) results provided disease status for *Mycoplasma agassizii* and *M. testudineum*. We evaluated trauma from canids (coyotes and dogs) based on trauma data gathered during health assessments. Raven risk was derived from raven point counts and nest surveys begun in Spring 2015. None of the sites is perfect for translocation due to the many constraints, but they are the best feasible sites.

⁴ BLM manages Areas of Critical Environmental Concern (ACEC's), National Landscape Conservation System (NCLS) lands, Wilderness Areas and Wilderness Study Areas (WSAs)

- o ACECs were established to "protect and prevent irreparable damage to important historic, cultural and scenic values; fish, wildlife resources or other natural systems or processes; or to protect human life and safety from natural hazards. ...the management of ACECs is focused on the resource or natural hazard of concern ... and in some cases may involve surface disturbing actions" (BLM no date).
- o Desert Wildlife Management Areas (DWMAs) were identified in the original and revised recovery plans (USFWS 1994a and 2011a); they are managed as ACECs by BLM. DWMAs act as reserves in which recovery actions are implemented.
- o NCLS lands comprise a collective system of conservation lands that are managed "to ensure their conservation, protection, and, if needed, restoration for the long-term benefit of surrounding communities" (BLM 2015).
- o Wilderness Areas are to be managed "to retain their primeval character and influence, without permanent improvements or human habitation... (and are to be)...protected and managed so as to preserve...natural conditions" (BLM 1995). Wilderness Study Areas are managed to preserve wilderness characteristics until Congress makes a final determination on the management of WSAs.

USFWS is responsible for Critical Habitat (CH) and for the development of Tortoise Conservation Areas (TCAs)

- o CH, designated for *G. agassizii* in 1994 by USFWS (1994b), provides legal protection for key areas for recovery where conservation actions can be focused.
- o TCAs are focus areas within existing desert tortoise conservation areas where aggressive management is recommended to ensure that populations remain distributed throughout the species range (USFWS 2011).

The Combat Center has established Special Use Areas (SUAs) in the training areas that are off limits to military training and vehicle travel off of Main Supply Routes (MSRs), with limited exceptions for Conservation Law Enforcement Officers (CLEOs), authorized NREA staff, and water and maintenance crews.

Table 3. Characteristics of recipient and control areas that are related to site choice. Recipient areas include release plus dispersal areas; control sites are the approximate areas within which tortoises were sought or studied. Conservation areas include existing areas and new areas proposed by the DRECP, Feinstein Bill, and Cook Bill. The Cook Bill resembles the Feinstein Bill in most areas relevant to the Combat Center translocation and is incorporated by reference except where it diverges. See text for explanation of conservation areas.

Site	Associated Conservation Areas ¹	Land Uses
Recipient Areas		
Lucerne-Ord	Substantially overlaps: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Ord-Rodman Tortoise Conservation Area	Large transmission line corridor Limited Use OHV designation but possible proliferation anticipated Overlaps Ord Mountain grazing allotment Mixture of federal and private lands Scattered occupied residents >6.6 km south of the release area
Rodman Sunshine Peak North	Substantially overlaps: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Sunshine Peak Training Area Ord-Rodman Tortoise Conservation Area Bordered by Rodman Mountains Wilderness	Large transmission line corridor No projected future use of area ³ Overlaps Ord Mountain grazing allotment ~3 km ² All lands federally owned
Siberia	In: Proposed Mojave Trails National Monument (Feinstein Bill) Proposed ACEC (DRECP) Overlaps: Proposed National Landscape Conservation System (DRECP) Borders the Combat Center	Negligible recreation use, although gas pipelines provide ingress routes No projected use of area ³ but large block of private lands in west - former proposed solar energy project Mixture of federal, state and private lands
Broadwell	Substantially overlaps: Cady Mountains Wilderness Study Area Proposed National Landscape Conservation System (DRECP) Proposed ACEC (DRECP) Proposed Mojave Trails National Monument (Feinstein Bill) Near Kelso Dunes Wilderness	Retired grazing allotment Negligible recreation use No projected future use of area ² Large transmission line corridor Nearly all lands federally owned
Cleghorn Recipient	Entirely on the Combat Center- Cleghorn Lakes RTA SUA Adjacent to Cleghorn Wilderness	Scattered occupied houses with dogs, 6.7 km south

Control Areas		
Rodman Sunshine Peak South	On the Combat Center SUA Substantially overlaps: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Sunshine Peak Training Area Ord-Rodman Tortoise Conservation Area Bordered by Rodman Mountains Wilderness	Large transmission line corridor Residual Open OHV Area to north (will be fenced with tortoise exclusion fencing) Proposed expanded Open OHV Area to west (Cook Bill) Overlaps Ord Mountain grazing allotment All lands federally owned
Daggett	In: Ord-Rodman ACEC Ord-Rodman Critical Habitat Unit Proposed National Landscape Conservation System (DRECP) Abuts Rodman Mountains Wilderness	Large transmission line corridor Mixture of federal and private land No projected future use of area ³ ≥1.3 kms south of I-40 and Daggett
Ludlow	In: Proposed Mojave Trails National Monument (Feinstein Bill) Proposed ACEC (DRECP) Overlaps: Proposed National Landscape Conservation System (DRECP) Near the Combat Center	Negligible recreation use, although gas pipelines provide ingress routes Mixture of federal and state lands
Calico	Substantially overlaps: Proposed National Landscape Conservation System (DRECP) Proposed ACEC (DRECP) Abuts Proposed Mojave Trails National Monument (Feinstein Bill) Cady Mountains Wilderness Study Area	Retired grazing allotment Negligible recreation use No projected future use of area ² Large transmission line corridor Mostly federal land ownership
Cleghorn Control	Entirely on the Combat Center- Cleghorn Lakes Training Area SUA Adjacent to Cleghorn Wilderness	Scattered occupied houses with dogs, 5.5 km southeast
Bullion (C)	Entirely in Cleghorn Wilderness Borders the Combat Center	

1. Sources: *West Mojave Plan (BLM 2005)*, *DRECP* (CEC et al 2014), *Feinstein Bill* (Feinstein 2015), *Cook Bill* (Cook 2015)

2. C. Otahol (2015a)

3. C. Otahol (2015b)

Table 4. Mortality factors at the translocation and impact areas. Incidence of disease (positive (P) or suspect (S)), canid trauma and mortality rates include substantial data collected in Fall 2015 that are not yet fully analyzed. Disease data are from Fall 2014 and 2015 unless noted. Canid trauma ranks follow trauma scoring in Berry and Christopher (2001): mild (2); moderate (3); and severe (4). Cumulative ranks are a combined ranking of canid-related trauma for gulars, flares, and limbs. Raven survey information is incomplete because surveys were expanded after the nesting season in 2015 to accommodate several new sites. "Offending raven" nests have juvenile tortoise remains beneath (USFWS 2008). N.A.=Not Available

Site	Incidence of Disease ¹						Canid Trauma					Ravens Nests/ "Offending Raven" Nests
	<i>M agassizii</i>		<i>M. testudineum</i>		Total Analyzed	% of Total That Are Seropositive	Rankings			Total analyzed	% of Total with Rank 3 or 4	
	P	S	P	S			2	3	4			
Impact												
WEA SEA	18	77	8	21	1056	2.5	NA					NA
	0	4	0	0	89	0	NA					NA
Recipient (R)												
Rodman Sunshine Peak N (2014) ² Lucerne-Ord Broadwell Siberia Cleghorn (R) (2013)												11/ 2
	0	2	0	0	24	0	32	24	12	121	29.8	
	0	1	0	1	16	0	4	1	1	17	11.8	
	3	1	6	16	100	8.0	19	23	16	102	38.2	8/1
	NA											
	3	2	0	3	25	12.0	6	6	1	27	25.9	NA
	0	3	0	1	40	0.0	10	8	3	41	26.8	NA
	0	0	0	0	21	0	6	5	8	19	30.8	NA
	1	0	0	3	22 ³	4.5	NA					
Control (C)												
Rodman Sunshine Peak S Daggett Calico Ludlow Cleghorn (C) Bullion (C)	1	9	0	0	22	4.5	NA					1 / 0
	7	5	3	0	53	18.9	33	24	16	100	40.0	9 / 0
	NA						11	3	2	37	13.5	NA
	2	1	0	1	26	7.7	8	5	1	27	22.2	NA
	9	0	0	2	37	0.0	11	3	2	37	13.5	NA
	1	2	0	0	17	2.6 (Cleghorn R+ C)	8	3	5	18	40.0	NA
	0	0	0	0	23	0	8	4	2	23	26.1	NA

1. Results as of 1 Nov 15. Total is number of samples analyzed to date. Percent of total is for tortoises that are seropositive for one or both species of *Mycoplasma*.

2. Source: P. Woodman, unpub. data

3. Source: Kiva (2013)

3.3.1 RECIPIENT AREAS

Lucerne Ord

This site is a broad area of mixed fair to good quality habitats with a pre-translocation density of 5.2 tortoises/km² (Table 6). It lies in a large bowl with natural topographic barriers (Ord Mountains) to the west and north. There are no highways or heavily used roads. While it receives substantial protection from future development via its overlap with multiple conservation areas (Table 3, Figure 3a), the edges of the dispersal area abut the Johnson Valley Open Off Highway Vehicle (OHV) Area. Although the recipient area is BLM-designated for Limited Use (i.e., travel on existing routes only), OHV use is moderate to high near low mountains and along some roads. OHV proliferation may occur due to loss of parts of the Johnson Valley Open OHV area for the Combat Center expansion. The Combat Center expansion Environmental Impact Statement (EIS; Navy 2011b) concluded that the Ord Mountain route network would be expected to see a pronounced increase in OHV activity as a result of displaced use from Johnson Valley, due to the area's popularity and spillover from Stoddard Valley (TEC 2011). However, the study cautioned that data on reliable projections of increased OHV activity and locations were unavailable and that "projecting increases in OHV use with any certainty, by specific location with the ODA [Open Desert Area], was described by OHV enforcement experts as a near impossibility – there are too many factors, which change dynamically before they can be studied, to establish a reliable projection."

The southern edge of the Ord Mountain grazing allotment intersects the northern roughly third of the recipient area (47 km² of overlap). This allotment has a long history of cattle grazing and an allowable limit of 302 cattle (3632 Animal Unit Months [AUMs]) (BLM 2006), although only approximately 30 or fewer cows have been grazed for the last few years (A. Chavez, 2015). Per stipulations in the West Mojave Plan (WMP; BLM 2005), cattle grazing is to be excluded during spring and fall throughout this overlap area in years when biomass production of ephemeral vegetation is below 230 lb/acre (BLM 2006). There are no water sources for cattle in Lucerne Valley (BLM 2006).

The transmission line subsidizes nesting for ravens, and eight active raven nests within 6.5 km of the recipient area were present on the power poles in Spring 2015 (Table 4). One was an "offending raven" nest, under which hatchling tortoise remains were observed. Late spring and summer point counts in 2015 suggested relatively low raven density, generally none, but up to 2 ravens per 10 km² (Figure 4). But, during other surveys in September, flocks of dozens of ravens were seen daily flying through the valley.

Domestic dogs were responsible for mauling and killing tortoises in the southern portion of the recipient area in previous years (Jones 2002). However, many of the houses in Lucerne Valley are now abandoned; the nearest occupied house is 6.6 km south of the release site. Elevated canid trauma (Ranks 3 and 4) was evident in 38.2 % of the 102 tortoises (Table 4), but all trauma was healed. This may suggest that dogs are no longer roaming the area.

Despite these potential or realized threats, mortality is not unusually high compared to other sites. Preliminary estimates suggest annual mortality rates of fewer than 0.5 adult tortoises per km² in the last four years. While not as high as Rodman-Sunshine Peak North or Daggett Control, this is still high compared to the 2% suggested by Turner and Berry (1984) as “normal” for a sustainable population. This consistently high mortality rate throughout the study sites is very possibly the result of the multi-year drought in this region. Forage production in this area was negligible in 2012, 2013, and 2015 (A. Karl, field notes). Drought has been implicated in documented mortality episodes (Peterson 1994, Longshore et al. 2003, Karl 2004, Lovich et al. 2014).

Rodman-Sunshine Peak North

This site is a broad bajada of mixed fair, medium and moderately good habitat with a pre-translocation density of 4.9 tortoises/km². A broad, lava flow provides an impermeable barrier to tortoise movement toward Interstate-40 (I-40). No future development is anticipated, and with the exception of a transmission corridor with three high-voltage transmission lines, and a distribution line, there is little current disturbance. All of the lands are federally-owned (San Bernardino County 2015). This site is relatively protected by its large overlap with conservation areas and Sunshine Peak Range Training Area (RTA), and adjacency to the Rodman Wilderness (Figure 3b). Sunshine Peak receives extremely little disturbance. It is a “hung ordnance” area, where aircraft try to dislodge ordnance that fail to launch during training exercises. Ground activity, primarily by the Combat Center’s Explosive Ordnance Division (EOD), is limited to a few days per year, when EOD detonates or removes ordnance.

This site was configured to avoid dispersal into Wilderness, per BLM (Symons 2015), and provide at least a 6.5 km distance from the MEB northern battalion route. Because of the constraint to avoid Wilderness, most tortoises will have to be translocated to the Sunshine Peak RTA. To avoid translocation and tracking constraints due to limited access to the Sunshine Peak RTA, the Combat Center will implement a monitoring effort that varies from the other sites (Section 4.1.1, Tracking).. Despite these challenges, this remains a valuable recipient site due to its land use protections, and the proposed monitoring will provide useful information.

Mortality rates and factors are still being analyzed, but preliminary results suggest relatively high annual mortality rates of roughly 2 adult tortoises per km² for the last four years. The other recipient and control sites had annual mortalities below 0.7 over the same time period, except the Daggett Control site (see below). Infection by *M. agassizii* and *M. testudineum* appears to be very low; none of the 24 samples analyzed to date were positive for either pathogen and only two were suspect (Table 4). These results are virtually identical to those for 2014 (A.P. Woodman, unpub. data) in the same area. We are awaiting the lab results on the remaining samples from this site.

Nearly 30% of live tortoises exhibited elevated levels of trauma from canids (Ranks 3 and 4) at this site; 12 of 68 had fresh trauma. Trauma was largely confined to the furthest west areas closer to the freeway rest area and the Newberry Springs residences, mostly

beyond the dispersal area (Figure 5b). The transmission line subsidizes nesting for ravens, and 11 raven nests within 6.5 km of the recipient area were present on the power poles in Spring 2015 (Table 4). One was an “offending raven” nest, under which hatchling tortoise remains were observed. A second offending raven nest was inactive. Otherwise, ravens were observed at the site in generally low numbers (Figure 4).

Many of the shells were intact, suggesting that most tortoises died of causes other than predation. Given the relatively localized canid trauma and the apparent lack of Mycoplasmosis, a regional factor such as drought is a more likely the cause of the elevated mortality. In addition, a flood event in late Summer 2014 likely buried many tortoises. High mortality on this site would support the interpretation of a depleted population.

Siberia

The Siberia recipient area lies on a narrow, steep alluvial fan out of the Bullion Mountains, and has a pre-translocation density of 2.6 tortoises/km². There is no current use of the site that would negatively impact tortoises (Table 3), but it was formerly the site of a proposed solar plant (“Siberia”). A large block of private lands in the west leaves open the possibility of future development, although this area is no longer in a solar energy development zone (CEC et al. 2014). Currently, the area is proposed for conservation in the Desert Renewable Energy Conservation Plan (DRECP; California Energy Commission et al 2014), the California Desert Conservation and Recreation Act (“Feinstein Bill”; Feinstein 2015), and California Minerals, Off-Road Recreation and Conservation Act (“Cook Bill”; Cook 2015).

The release area here was constrained by three major factors: (a) proximity to the Combat Center; (b) distance to State Route 66 (SR 66); and (c) poor habitat in the center of the site. Without fencing, there are no barriers preventing tortoises from travelling onto the Combat Center. However, the USMC has agreed to fence the border with tortoise exclusion fencing to solve this problem. SR 66 is 6.5 km east at the nearest point. While this old highway is not heavily travelled, tortoise mortality is possible. Finally, most of the center of the fan is very poor habitat. The heavy monsoon during late Summer 2014 scoured the large wash system in the center of the fan, and little soil remains. Few tortoises remain in this scoured wash as well. During solar site surveys in 2012, 24 tortoises were found in this wash (URS 2014); during 2015 searches, only a single tortoise was found.

Preliminary analyses suggest annual mortality rates of roughly 0.7 adult tortoises per km² in the last four years; this is consistent with most of the other recipient and control sites and may reflect both the drought and the flood. Canid trauma was moderate, and consistent with most of the sites; 26.8% of the tortoises had elevated levels of trauma (Table 4). None of the canid trauma was fresh.

Broadwell

This site lies on a large, steeply sloping bajada bordered by low to tall mountains with a pre-translocation density of 5.1 tortoises/km². Much of the bajada has only moderate utility to tortoises because of the densely cobbly and gravelly substrates; the low species richness and plant volume is an indicator of this lower quality habitat. Not surprisingly, tortoises were disproportionately found in the incised washes of the upper bajada near the mountain toeslopes; these also had a high component of caliche cavities that are favored as burrows by tortoises.

The site achieves moderately high protection from overlapping and nearby existing and proposed conservation lands (Table 3, Figure 3d) and nearly all of the lands are federally owned. There is little current use of the area with the exception of a transmission corridor with two high-voltage transmission lines, and future development is not anticipated. The transmission line provides raven nesting subsidies, but has not been studied, so the degree of raven use of the area is unknown.

Preliminary analyses suggest annual mortality rates of fewer than 0.3 adult tortoises per km² in the last four years, consistent with most of the other recipient and control sites. Broadwell has a higher disease prevalence relative to *Mycoplasma* than some of the other sites – 12% of the tortoises sampled (n=25) were positive for *M. agassizii* (Table 4). Canid trauma was moderate, and consistent with most of the sites; 25.9% of the tortoises had elevated levels of trauma (Table 4). None of the canid trauma was fresh.

Cleghorn Recipient and Control

These sites are discussed together because they are only three kilometers apart, but separated by a tortoise exclusion fence. The recipient site will be completely fenced with tortoise exclusion fence and studied as a constrained dispersal site (Figure 3e; also see Section 4.2.3 below). After two years, the constraining fence on the east will be removed (the fence between the constrained dispersal area and SEA impact area will remain in perpetuity). A mark-recapture plot was established outside the current constrained dispersal area, and will be used as an additional control site until tortoises are released from the constrained dispersal pen.

Both the control and recipient sites are in undeveloped native habitat, with the recipient site having a pre-translocation density of 6.5 tortoises/km². They are on the Combat Center (the recipient site is in a Special Use Area [SUA]) and adjacent to Cleghorn Wilderness, so are protected from public use or development. Disease incidence relative to *Mycoplasma* is low. Only one in 38 tortoises was positive or suspect for *Mycoplasma* spp. in 2015 (Table 4). This is consistent with earlier surveys in 2010 in Cleghorn Pass RTA adjacent to the SEA – of six tortoises, none was positive and two were suspect (J. Smith 2011, unpub. NREA data).

While preliminary mortality rates are not higher than other sites (0.5 adult tortoises per km² per year in the last four years), canid trauma is the highest of any site. For the

combined sites, 59.5% of the tortoises had elevated levels of trauma (Table 4). None of the trauma was fresh and there was no clear distributional pattern that would suggest that dogs from the houses in Wonder Valley to the south were preying on tortoises (Figure 5e). Most of the trauma occurs within 6 km of the houses, but some is well north, near the mountains. There may well be two sources of canid trauma, domestic dogs and coyotes. Assuming that dog trauma is occurring (dogs could be heard during our surveys), we moved the constrained dispersal site beyond 6.5 km from the houses. Further, we plan to implement an information outreach program to encourage people to confine their dogs. We will also conduct a study to monitor dog and coyote presence, install deterrents for the constrained dispersal pen (e.g., hot wire), and implement a canid control program.

3.3.2 OTHER CONTROL SITES

Rodman-Sunshine Peak South

This control area is in an SUA adjacent to the WEA. It comprises a substantial area of moderately good and good habitat that is relatively protected by its large overlap with conservation areas and the SUA, and proximity to the Rodman Mountains Wilderness (Figure 3b). The main issue with the site is the tortoise exclusion fences. Tortoises will be separated from the training exercises by a tortoise-proof fence, but with tortoises fenced in on three sides, this does not represent a perfect, unmanipulated site.

Future OHV impacts are questionable. A small triangle (~12 km²) of Johnson Valley Open OHV remains north of the SUA (Figure 3b). At this time, the only access to this triangle is the transmission line maintenance road, so it is uncertain whether this area would be visited by recreationists. This could change, however, if the Cook Bill (Cook 2015) creates a broader connection between this isolated triangle and the main Open OHV area (Figure 3b).

Mortality factors (e.g., rates, canid predation) are not yet known. The transmission line subsidizes nesting for ravens but only one active raven nest was observed within 6.5 km (Table 4). Only one tortoise of the 22 sampled is seropositive for *M. agassizii*. We will complete surveys to find and transmitter additional control tortoises in early Spring 2016.

Daggett

This site was chosen because of its higher quality habitat over a relatively broad area and its separation from, but proximity to, the Rodman-Sunshine Peak North and Lucerne-Ord recipient sites. While a mixture of public and private lands, its location within conservation lands provide impediments to further development (Table 3, Figure 3g); BLM is not aware of any proposals for development (Otahol 2015b).

Preliminary mortality analyses suggest that annual mortality is relatively high, roughly 1.8 adult tortoises per km² for the last four years. This site is subject to the same regional drought-related pressures discussed earlier. Predator pressure is also high. Of 100

tortoises sampled, 40% have elevated levels of canid-related trauma (Table 4); 11 of 73 tortoises had unhealed injuries. There was no direct evidence of dogs (dogs or scat) during the surveys in Fall 2015 or pattern of trauma nearer the houses that would suggest domestic dogs (Figure 5f). Also, it seems unlikely that dogs would traverse the freeway from the towns of Daggett or Yermo to prey on tortoises; there is only one occupied house on the south side of the freeway and we don't know if dogs live there. Coyotes that are attracted to the residential and agricultural development at Daggett may be the canid predator at the Daggett control site. Further monitoring may provide answers.

The transmission line subsidizes nesting for ravens. Nine active raven nests were observed within 6.5 km (Table 4). Raven presence from May through July was relatively low, 0.5 ravens per 10 km² during point count surveys (Figure 4). However, agriculture, residential development, and the freeway provide several local food subsidies. Raven populations are likely to be moderately high in the area, with concomitant high predation on juvenile tortoises.

The presence of *Mycoplasma* infections is unusually high compared to other sites (Table 4), with 18.9% of the 53 tortoises analyzed to date are positive for *M. agassizii* and/or *M. testudineum*.

Ludlow

This site comprises fair to moderately good habitat, and is very similar to occupied areas of the paired Siberia site. It is relatively undisturbed by human activities; only a pipeline currently provides access, and use by the public appears negligible. Preliminary estimates of mortality suggest an annual rate of 0.7 adult tortoises per km² for the last four years, relatively consistent with most other recipient and control sites. Canid trauma was the lowest observed at any site – 13.5% (Table 4). Incidence of disease is not yet available.

Calico

This paired site to the Broadwell Recipient Site lies on a small south-facing bajada against the foothills of the Cady Mountains. It is relatively undisturbed by human activities and the former grazing allotment has been retired. It is marginally protected from development, based on current and proposed conservation designations (Table 3, Figure 3d). Impacts are similar to the Broadwell site. Infection by *Mycoplasma* spp. occurs in 7.7% of the tortoises tested (Table 4), which is slightly higher than most other recipient and control sites, but more similar to Broadwell (12%). Canid trauma was moderate, and consistent with most of the sites; 22.2% of the tortoises had elevated levels of trauma (Table 4) but none was fresh.

Bullion

This site has good habitat quality and receive high protection from public activities or development. Bullion is adjacent to the Cleghorn Wilderness and far from any human impacts. Future threats appear to be limited to training activities in that portion of the

control site in the Combat Center. Raven surveys have not been performed, analysis of mortality rates and trauma due to canids are under analysis and will be completed prior to translocation, and disease levels are low. Of 23 tortoises sampled in 2015, none was seropositive or suspect for *Mycoplasma*. Historically, no tortoises had signs of respiratory disease or were seropositive for *Mycoplasma* on the Bullion demographic plot in 2001, 2002, 2003, or 2008 (Kiva 2008). In 2013, one tortoise tested seropositive for *M. agassizii* and three were suspect for *M. testudineum* (Kiva 2013).

3.3.2 CORRECTION OF SIBERIA AND BROADWELL VALLEY SITES

The Siberia and Broadwell Valley sites were similar in elevation and topography with variation in both and tortoise distributions within each site (Section 3.3, Figures 5c & 5d). Tortoises were transmittered and had health assessed in 19 and 24 km² (36 & 38% respectively) of the respective sites in 2015, but occurrence and density were not measured for the entire sites. Tortoises should exist outside the surveyed areas as tortoises move, areas not surveyed included features similar to those of surveyed areas, and the sites are generally accommodating to tortoises (Section 3.3). Only one tortoise was found in Siberia's great wash in 2015, but 24 were found there in 2012 (Section 3.3).

We also quantified the area of suitable habitat using the model created by Barrows et al 2016, which used local calibration data (MCAGCC and expansion study areas) for a fine scale analysis. The habitat model indicates 44% of the Siberia site meets the 0.6 habitat suitability index (HSI). The model criterion excludes habitat of lower quality, and tortoises were found outside the 0.6 HSI boundaries in 2015 (Figure 5c). To be conservative, we consider the area outside the boundaries as lower quality than within the boundaries of the model. If we estimate that one third of this area ($=0.33 \times 56\%=18\%$) can support tortoises at an HSI of 0.6, then roughly 62% ($=44+18$) of Siberia is suitable, corrected to the HSI of 0.6. Broadwell Valley is similar to Siberia, albeit slightly smaller and at a slightly higher elevation, which might support higher tortoise densities than Siberia can today and in the future given climate change (Barrows et al. 2016).

The amount of quality habitat per unit area of Broadwell Valley and Siberia is about 67% of that for Lucerne-Ord and Rodman-Sunshine Peak sites. This could be construed that Broadwell Valley and Siberia will have, per unit area of dispersal, post-translocation densities similar to that of Lucerne-Ord and Rodman-Sunshine Peak (i.e., 5.5 adults per km² divided by 0.67 or 67% ~ 8 adults per km²; Table 6). As corrected, the post-translocation densities would be roughly similar among the four recipient sites (excluding Cleghorn Lakes). We will compare results with post-translocation densities calculated by both means (uncorrected and per unit of 0.6 HSI habitat).

3.4 RECIPIENT SITE PREPARATION

3.4.1 TORTOISE EXCLUSION FENCING

Permanent tortoise exclusion fencing will be installed prior to translocation:

- Between impact areas and recipient areas and/or SUAs, to keep tortoises from entering the impact areas (Figures 3b and 3e);
- Between recipient areas and the Open OHV Area north of the WEA (Figure 3b); and
- Along the Combat Center border at the Siberia site, to keep transmittered tortoises from crossing into the Combat Center (Figure 3c).

Temporary tortoise exclusion fencing will be installed at two locations to keep tortoises from dispersing into the Cleghorn Wilderness:

- The constrained dispersal plot in Cleghorn Lakes RTA (Figure 3e); and
- The southern portion of the Bullion RTA (Figure 3f).

Materials and Design

Exclusion fence materials and design will comply with USFWS (2009a) specifications. For temporary fencing, rebar or other sufficiently sturdy posts may replace t-stakes. In all cases, supporting stakes will be spaced sufficiently to maintain fence integrity. Tortoise-proof grates (“cattle guards”) will be installed at entry points where unimpeded vehicle traffic is necessary.

Surveys and Monitoring during Fence Construction

Within 24 hours prior to fence installation, biologists will survey the staked fenceline for tortoises and for all burrows that could be used by tortoises. Surveys will include 100% of all areas to be disturbed by fencing and a swath of at least 90 ft centered on the fenceline, using 5 m-wide transects. Tortoise burrows will be mapped using Global Positioning System (GPS), and the burrow size and occupancy recorded. If not occupied, indications of how recently the burrow was used will be recorded. Occupancy will be determined by a combined use of reflective mirrors, probing, tapping the entrance, listening, and/or scoping with a fiberoptics scope. In all cases, occupancy will be verified only if all interior edges of the burrow can be felt, such that a “hidden” chamber at the end is not missed. Any tools used inside a burrow will be disinfected before use in another burrow, using the most recent disease prevention techniques (e.g., USFWS 2015a). Burrows may be flagged, if it will not attract poaching. Flagging also may attract predators, but can be placed at a standardized distance and direction from burrows.

All burrows will be visually and tactilely examined for occupancy by tortoises and other wildlife. If occupancy is negative or cannot be established, the burrow will be carefully

excavated with hand tools, using standardized techniques approved by USFWS (2009a) and the Desert Tortoise Council (1994), including disinfection techniques for all tools.

The fencing will be shifted to avoid all burrows over 0.5 meters in length and all active burrows, with the fence placed between the avoided burrows and future intensive training. Fence construction may occur during any time of the year (USFWS 2011b). All fence construction will be monitored by approved biological monitors (BMs) to ensure that no desert tortoises are harmed. The level of monitoring will depend on the specific fencing activity, but at least one tortoise monitor will accompany each separate construction team, such that no driving, trenching, fence pulling, or any surface disturbing activities will occur without the immediate presence of a monitor. Maps of burrows from the pre-construction survey will be provided to all BMs to assist in protecting tortoises. Such maps may also be useful for relocating tortoises.

All exclusion fencing will be inspected monthly and immediately after all rainfall events where soil and water flow could damage the fence or erode the soil underneath. Any damage to any fencing, either permanent or temporary, will be repaired immediately. If exclusion fencing is installed when tortoises are known to be active, either from spring through fall or in winter during unusually warm weather, then all installed exclusion fence (partial or complete) will be checked 2-3 times daily for two weeks to ensure that no tortoise is fence-walking to the point of exhaustion or overexposure. If midday temperatures are above thresholds at which tortoises must go underground to escape heat (approximately 43°C ground temperature), then one of the fence checks should occur one hour prior to this threshold being reached. This same process will occur for the first 2-3 weeks of the activity season if the fence is installed in winter, when tortoises are underground.

Tortoise Disposition during Fence Construction

Any nests found between November 1 and April 15 are unlikely to be viable and will not be moved; hatching is typically completed by October (BT Henen and AE Karl, unpub. obs.). In the event that nests are found between April 15 and October 31, the nests will be moved. Eggs will be inspected to determine if they are viable and, if so, will be moved to a similar microsite (e.g., cover, plant species, soil type, substrate, aspect) on the recipient sites using standard techniques (e.g. Desert Tortoise Council 1994, USFWS 2009b). Translocated nests may be fenced with open-mesh fencing (e.g. 3-5 cm wide mesh) that will permit hatchlings to escape but prevent depredation by canids that might be attracted by human scent to the new nests. Alternatively, smaller mesh fencing or other techniques may be used to prevent ground squirrel predation on nests. Open-mesh fencing or avian netting also will be installed on the roof of the nest enclosure to prevent predator entry. Nests will be monitored from a 30-foot distance once a month until late November, at which time they will be excavated for examination. If possible, hatchlings will be weighed, measured, photographed, described, and marked.

3.4.2 PREDATOR MONITORING AND CONTROL

Management of coyote and raven predation of desert tortoises is an explicit part of the translocation program. Coyote populations are unlikely to be harmed by removal of some animals. By contrast, tortoise populations are already strongly diminished and the species is imperiled. The intent of the Combat Center translocation is to augment tortoise populations and improve recovery possibilities, not subsidize coyotes in the form of translocated tortoises. Accordingly, coyotes will be controlled in the translocation areas.

Prevention

The Combat Center will continue implementing policies that reduce predator subsidies, such as water and food waste controls. In addition, the Combat Center is partnering with USFWS to study the effectiveness of raven aversion techniques.

Monitoring

Post-translocation monitoring of translocated and control tortoise populations will be the primary means of detecting predation. This monitoring will be supplemented by regular Conservation Law Enforcement Officer (CLEO) patrols through the recipient and control sites. The Combat Center has also budgeted for predator-specific surveys (e.g., surveys for raven nests along pole lines), and will implement these surveys as funds are available.

Depredation

The Combat Center will establish a coyote hunting program aboard the installation. This includes measures to increase the local hunting population, such as providing pre-licensing hunter safety education and offering information about hunting opportunities in the area. The Combat Center will organize coyote depredation hunts to reduce the local coyote population, and will actively deploy CLEOs for coyote trapping and hunting into areas where coyote predation rates of translocated tortoises exceed those of control populations. Ravens with evidence of predation on tortoises will be reported to USFWS for depredation.

3.5 DISPOSITION CRITERIA

Three questions must be answered to determine where individual tortoises will be translocated:

1. How many tortoises go to each site?
2. Which individuals will go to which site?
3. Of the group in #2, which tortoises will keep transmitters (only 225 of the existing 1138)?

The answer to the first question is based on experimental augmentation densities as explained in Section 4.2.1, below (also see Table 6). The second and third are subject to a number of criteria, including, but not limited to:

- Demography – maintaining capture area sex ratios and population size structure.
- Social groups – Male tortoises are known to be familiar and mate with specific females in their area. While social “groups” may be difficult to determine without extensive observation or genetic paternity testing, geography may serve as a logical surrogate for moving groups of tortoises together.
- Habitat types – While tortoises are highly opportunistic and may thrive in new habitats, tortoises accustomed to living in certain topographies (e.g., rocky slopes; incised washes; gentle bajadas with deep, friable soil) may adjust more readily to a new location if the habitat is similar to that at the capture location. The Combat Center will generally move tortoises to new locations with topographies similar to their home sites. However, to limit the distance from impact area to recipient site, some tortoises from different topographies in the WEA will be moved to Lucerne-Ord, where they may spread to nearby topographies most similar to their home sites.
- Disease Levels – Epidemiological considerations related to seropositive, suspect, or clinically ill tortoises will be evaluated to minimize the spread of *Mycoplasma* spp. Some tortoises in the impact area may not be suitable candidates for translocation because of a moderate to severe nasal discharge, oral plaques, or other conditions that may compromise survival (USFWS 2015a). While there are no tortoises in the WEA or SEA that are known to currently meet these latter criteria, conditions could change.

Disposition plans for every tortoise (or groups) are currently under development and will be submitted to USFWS for approval in ample time for review.

4.0 MONITORING AND RESEARCH

Choice of recipient sites is critical towards a better chance for translocation success, but we will know how well we succeed through carefully defining and evaluating variables to monitor. The overarching goal is to minimize losses and maximize assimilation into the existing population. Monitoring and research are essential to quantify how well the translocation addresses this goal. This translocation provides numerous opportunities to answer research questions that increase our understanding of the species and advance species recovery. However, we prioritize a successful translocation above research.

4.1 SURVIVAL AND ASSIMILATION

4.1.1 SURVIVAL

Survival will be examined primarily from tracking observations of radiotelemetered animals (Table 5). However, the survivorship or mortality of marked tortoises will also be analyzed from mark-recapture surveys, health assessment records, and transect surveys. The combination of health assessments (general observations and specific USFWS health assessments) and habitat analyses are planned to help interpret the factors

affecting survivorship, assimilation, and abundance. Each technique is described below with a discussion of the data analyses.

Tracking

Survival will be assessed via tracking 675 telemetered tortoises, 225 each of translocated, control, and resident groups, with 225 representing approximately 20% (190 tortoises) of the adults, and 5% (35 tortoises) of the juveniles originally anticipated to be translocated (Table 1, USFWS 2012). Translocated, resident, and control tortoises will be tracked the first year according to the schedule in the *Guidance* USFWS (2011b; see Section 3.1, above). We anticipate that translocated tortoises will settle somewhat into newer home ranges after one year (Nussear 2004, Karl and Resource Design Technology 2007, Field et al. 2007), at which time we will track them less frequently: weekly during high activity periods - April, May, October and the last half of September; every two weeks from June through the first half of September; and monthly during November through February (~26 locations per tortoise per year).

After five years, the transmitted group will be decreased to 150 tortoises (50 per group) and monitored via tracking for five more years, using the decreased tracking schedule above. Then we will remove these transmitters unless the Combat Center and the resource agencies determine that additional monitoring would be productive.

During tracking, for every live, numbered tortoise observed, we will record location (UTM), behavior (e.g., foraging, mating, fighting, other tortoise interactions, walking), position (sheltered in shade, above-ground, or burrowed), burrow attributes (length, type, distance of tortoise in burrow), and health, if possible. We will photograph any dead, numbered tortoise and record data on time since death, cause of death and rationale, and percent of shell remaining. Trackers will note unusual raven or coyote activity, illegal or elevated legal OHV activity, or other unexpected or intense potential risks to tortoises.

We will analyze survivorship of the translocated and resident tortoises compared to control tortoises, with most data gathered during the first active season (release until brumation), each of the first five years (675 transmitted tortoises), and for years six to ten (n=150 transmitted tortoises). We will use Kaplan-Meier methods to evaluate survivorship for and among groups (controls, residents and translocatees), and comparisons among periods (e.g., months, seasons, years and extended periods), sites, sexes, sizes, age classes, health status (e.g., *Mycoplasma* test results and Body Condition Scores), and other independent variables (e.g., habitat type and levels of ground disturbance or predator sign). Kaplan-Meier curves may be compared with log rank tests or hazard ratios (Rich et al. 2010). We may also compare survivorship among groups and independent variables using contingency table analyses (e.g., Zar 1999 & Field et al. 2007). We will consider AIC_c – based model selection to evaluate models including group, site, sex, and other variables (e.g., Nussear et al. 2012).

Rodman-Sunshine Peak North - We propose a combination of radiotracking, mark-recapture plots (see methods below), and transect surveys of tortoise density (USFWS

2010; see Dispersal Area Monitoring below) to monitor survivorship, tortoise density, health (methods below), and habitat quality (see Dispersal Area Monitoring, below) at the Rodman-Sunshine Peak North site. We will perform, for the first three years, a series of line transects across the broad dispersal area to a) estimate tortoise density for the dispersal area, and b) collect data on as many tortoises, residents, translocatees, transmitted, untransmitted, marked, and unmarked tortoises in Sunshine Peak. This will help us find animals in each of these categories that are translocatees or residents and enable us to perform health assessments, increasing sample sizes and statistical power. During the first couple of years tortoises will likely disperse across most of the dispersal area. After the first three years we will use these data to determine if there are suitable plot locations for long-term (e.g., 5-year intervals) monitoring, or sustain monitoring via the line transects.

We anticipate ready access to this training area at least two times per year, and will attempt to schedule additional access to the training area to support tracking telemetered tortoises. If additional access proves infeasible, however, transmitters for these animals will be removed so tortoises are not burdened with unused transmitters.

We will consider Global Positioning System (GPS), satellite, or cellular transmitters for monitoring when the technology becomes suitable to not compromise tortoise survivorship.

Table 5. Main study objectives, methods used, and variables used in two critical facets of effectiveness monitoring: Survival and Assimilation. For each Method, we list the primary dependent variables (indicator variables) and secondary indicators gathered while measuring primary dependent variables. Independent or predictor variables range from select categorical variables (e.g., treatment group) to uncontrolled continuous variables (e.g., rainfall); they are not listed with any one method. BCS = body condition score. COD = cause of death

Study Objective	Methods	Dependent Variables, primary	Secondary indicators, from Method	Independent Variables
Survival	Tracking	Individual, annual & percent survivorship (per group, site, sex, age, etc.)	COD estimation (e.g., predator, drought, disease or vehicle strike)	Groups - Translocatees, Residents, Controls
			Simple health measures - trauma & clinical sign	Site
			Behavior (e.g., fighting, pacing, active, dormant or thermoregulating), time spent aboveground, and coversite choice & formation	Research treatment (density, grazing, constrained dispersal, translocation distance, headstart); not independent of site
			Spatial - movement frequency, distance & displacement; home range or activity areas	Sex - male, female, undiscernible or juvenile
	Mark-Recapture Plots	Density; among-year recaptures and carcass information contribute to survivorship estimates, as above	Health, behavior, movement & COD as above	Size & condition ¹ - body mass, carapace length, shell volume (covariate); BCS & body density (see also Secondary Indicators)
			Changes in population density and demography (size and sex frequencies) may support or contradict survivorship measures	Time since translocation
			Growth - change in mass, length, volume, and secondary sexual characters	Weather, especially rainfall (mm) per winter, season or other relevant period, including prolonged drought; dichotomous, index or continuous-scale (ratio-scale) data from gauges
	Health Assessments	Recapture and carcass information contribute to survivorship estimates, as above	Full health measures, incidence (ranking, %) and severity (categorical or indices) of trauma and clinical signs, condition indices, ELISA results (positive, negative or suspect categories, for both <i>Mycoplasma</i> spp.), growth	Habitat condition, change; annual plant cover, invasive plant cover
			COD, behavior and growth as above; palpation of eggs	Cattle grazing - dichotomous, index or continuous-scale (ratio-scale)

	Transects	Recapture and carcass information contribute to survivorship estimates, as above	Density, demography, COD, and general health, behavior & growth as above	Ground or vegetation disturbance (e.g., vehicle) - dichotomous, indexed or continuous-scale (e.g., vehicle track counts)
				Predator counts (e.g., Common Raven and coyote) - presence or absence, indices, point counts or point count rates Proximity to predators & subsidies (e.g., transmission lines, raven nests, human communities or recreation areas)
Assimilation	Microsatellite markers & single nucleotide polymorphisms	Egg and clutch paternity (group assignment) ²	Annual egg & hatchling production, # per female	Group (Translocatees, Recipients, Controls), site, treatment, translocation distance and time since translocation (e.g., 3, 5, 7 & 9 years post-translocation); see Survival above for additional variables, such as body size
	Tracking, health assessment and transect encounters	Behavior (e.g., fighting, mating, egg-laying, pacing, active, dormant or poor thermoregulation), responsiveness, posture, and coversite co-use (e.g., mixed group)	Spatial - movement frequency, distance & displacement; palpation for eggs: during health assessments (in season)	as above
	Tracking	Spatial - overlapping home range or activity area	Behavior, as above	as above

1. Growth and condition can be used as an indicator or predictor variable, depending on the particular analysis.

2. Davy et al. (2011) & Rico & Murphy, unpublished data for NREA

Table 6. Number of tortoises to be translocated to each recipient site. Size categories for adults (carapace length ≥ 160 mm) and juveniles (carapace length < 160 mm) follow USFWS (2012). Juveniles with carapace length < 110 mm will be translocated after headstarting. Initial densities are based on USFWS pre-project methods.

Recipient Site	Initial Density (tortoise/km ²)	Projected ⁵ Density	Translocatees	Post-Translocation Density
Lucerne-Ord	5.2	4.01	448	8
Rodman-Sunshine Peak North	4.9	3.78	316	8
Siberia	2.6	2.08	182	5.5
Broadwell	5.1	4.09	19	5.5
Cleghorn Recipient (constrained)	6.5	5.21	32	10.5

Table 7. Approximate number of transmittered resident and control tortoises targeted for each site. Sex ratios mirror sex ratios on the relevant impact area (1.3:1 for the WEA, 1.0:1 for the SEA).

Size Cohort (Sex/Transmitter Size)	≥160 mm MCL			~120-159 mm (RI2B-6 g)
	Male	Female	Total	
RECIPIENT SITES				
Lucerne-Ord	38	27	65	15
Rodman-Sunshine Peak North	26	19	45	20
Siberia	15	15	30	0
Broadwell	13	12	25	0
Cleghorn Recipient	13	12	25	0
TOTAL Resident Tortoises			190	35
CONTROL SITES				
Rodman-Sunshine Peak South	25	19	44	15
Daggett	31	24	55	20
Ludlow	12	9	21	0
Calico	11	9	20	0
Cleghorn Control	13	12	25	0
Bullion Control	12	13	25	0
TOTAL Control Tortoises			190	35

⁵ Based on draft USFWS translocation guidance. Assumes an 8.3% decrease per year for the Lucerne-Ord and Rodman-Sunshine Peak recipient sites and a 7.1% decrease per year for remaining sites over three years.

Mark-Recapture Plots

We will repeatedly evaluate mark-recapture plots at control and recipient sites to help monitor the survival of translocatees and residents (see above for approach to survival analyses). These plot analyses will also provide estimates of tortoise density (tortoises per km²) and demography (e.g., sex and age structure), and support planned measures of site fidelity (e.g., Nussear et al. 2012), health assessments (see below), and other variables (e.g., habitat condition and health parameters) that may determine or help explain the survivorship of the groups at the translocation and control sites. These plots, especially control plots, will also provide a general reference for population monitoring in the area.

Twelve 1-km² plots have been established in the recipient and control areas, five in control sites and seven in recipient areas (Table 2). Each plot will be surveyed for population density and structure every five years for 30 years, an interval consistent with Strategy 4 of the revised Recovery Plan (USFWS 2011a). Standard mark-recapture techniques (e.g., Lincoln-Peterson) will be employed, with at least two passes, and all captured tortoises weighed, measured, photographed, sexed, and described. For these demographic plans, we will collect the additional data identified above for live and dead tortoises found during tracking. We will assess health, test for *Mycoplasma* spp. antibodies (see Section 6.3, below), and store blood sample residues for genetic (see Section 4.2.4, below) analysis.

During each reading of the mark-recapture plots, we will assess habitat to monitor changes or stability. We will use standardized transects to measure percent cover, density, frequency, species richness, species evenness, and robustness of perennial plants. On these same transects, hydrology, annuals (percent cover and biomass by species), substrates, and soils will be measured on stratified-random quadrats. All annuals present on each transect, including all tortoise forage species, will be inventoried. Exotic annuals will also be measured to document spread and population increases. Surface disturbance will be measured by type and age. Perennials, soils, substrates, and hydrology will be measured every 10 years for 30 years. Annuals and surface disturbance will be measured every five years on all plots. Biomass will be measured on a subset of the mark-recapture plots every five years.

Further, we will quantify predator use of the site, documenting species, abundance, and distribution. Raven numbers (individuals and nests) will be recorded and the area below nests of both ravens and large raptors will be searched for tortoise remains. Qualitatively, OHV recreation, unforeseen developments, and any evidence of free-ranging dogs and/or coyotes will be documented and described. We have started raven surveys (Figure 4) and canid surveys (February 2016).

Health Assessments

The tortoise health assessments will help us find marked tortoises, transmitted or not, and monitor their survivorship. The assessments will provide health, disease, and trauma

indicators to help interpret group survivorship at and among sites and other categories (e.g., sex or age).

We will monitor disease incidence and other potential health issues via standardized assessments (USFWS 2015a, Berry and Christopher 2001) of clinical sign, injury, *Mycoplasma* spp. antibodies, cutaneous dyskeratosis, body condition scores, and mass-to-volume ratios [cf Loehr et al. 2004]) of telemetered tortoises, all tortoises captured on mark-recapture plots, and opportunistically on transect surveys (see *Transects*, below). For telemetered tortoises, a minimum of 150 transmittered tortoises (50 from each group, and at least 10 per site) will be assessed. A high site incidence of disease or trauma may trigger additional assessments for that site. We will assess health two times a year at each site, half the monitored population in spring and half in fall, during the first five years when the initial stressors from translocation may be greater. We will repeat health assessments at 5 and 10 years when transmitters are removed. Formal health assessments and tissue collection (blood samples and oral swabs) will be performed in October (prior to brumation) and April when activity monitoring substantiates that tortoises are active enough to express immune system responses. In addition, each time a tortoise is handled it will be examined for clinical signs of disease and trauma. The Combat Center will consult with USFWS with regard to incorporating new testing methods as they become generally accepted.

Dispersal Area Monitoring

Although the radiotracking will provide the strongest information about survivorship via its relatively high sample size and repeated measures statistical analyses, the mark-recapture, health assessment, and density transect surveys will provide additional monitoring of the three groups (translocatees, residents, and controls). The mark-recapture data are limited to 12 localized sites, but tortoise density transects over dispersal areas can provide survivorship data of marked (transmittered or not) translocatees, residents, and controls over large areas of the study sites. These surveys will help us find these tortoises, help us estimate survivorship of groups, and help us quantify tortoise density (USFWS 2010), tortoise sign, predator sign, and anthropogenic disturbance. The latter measures will help interpret influences on tortoise survivorship. We will survey 1-km to 12-km long, line transects spaced over the recipient and control areas. Depending on tortoise density and the size of the dispersal area, there may be as many as 5 to 10 transect passes per km².

Also, we will use rain gauges at all sites to measure precipitation. We may install more sophisticated weather stations (e.g., Onset HOBO U30) at more protected sites to augment weather data (e.g., ambient temperature, wind speeds, relative humidity) collected by radiotrackers.

Data Analysis

We will analyze data from these for methods to evaluate the survivorship of the translocated and resident tortoises compared to control tortoises. Values not statistically

different from the control values may be considered most successful (see Kaplan-Meier in Tracking, above). The additional data on behavior, burrow use, health status, habitat quality, and other secondary variables (Table 5) may also be analyzed for effects on survivorship. We will consider additional tests and comparisons (e.g., analyses of variance comparing health status among controls, residents and translocatees, or between those that survive and those that died recently) as these may help explain the proximate causes of mortality. The number of comparisons possible is extensive, but may also include Analyses of Covariance (ANCOVA or MANCOVA) to evaluate categorical differences after correcting for covariates such as body size, body condition scores, distances moved, rainfall, or annual plant production. We may also consider multimodel inference analyses to evaluate effects of group, sex, site, rainfall, and other variables (e.g., Burnham and Anderson 2002; Nussle et al. 2012).

4.1.2 ASSIMILATION

Assimilation into the population would be accomplished if translocated tortoises reproduced successfully with resident tortoises. Results for Fort Irwin (R.C. Averill-Murray, pers. comm.) suggest that translocated males were not assimilating to the resident population (they did not produce offspring), but the translocated females produced offspring from resident males. There may be a period that translocated animals need to assimilate.

The main question is to what degree translocated tortoises assimilate with residents. Also, we may be able to use control values as an additional comparison for some measures of assimilation. We will evaluate assimilation via genetic analyses, but will also consider phenotypic data (e.g., home range overlap and site fidelity; Nussle et al 2012) that may indicate potential for mixing of individuals, or settling of individuals in the recipient areas. Genetic assimilation can be measured by paternity of individuals, clutches, and the combination for each group (translocatees and resident), by using assignment tests to compare offspring genetics (e.g., 20 microsatellite loci from genomic DNA; Davy et al. 2011) to those of the parent populations, translocatees, and residents (genetic results evaluated using discriminant analyses; Y. Rico and R. Murphy, unpublished data). The mixture of offspring among the two parent groups indicates a degree of assimilation. Little is known about the long-term viability of stored sperm, and how quickly new inseminations may influence offspring parentage. We may be able to evaluate the rate (e.g., years) at which clutches become more mixed, and what is the equilibrium state of mixing.

We propose evaluating genetic assimilation at years 3 and 5 post-translocation, and if data indicate assimilation requires longer, at later times (e.g., years 10 and 15). The blood sample residues, from which the DNA is analyzed (Rico and Murphy, unpublished data), are retained (banked) from the health assessment studies for the translocatees and the translocated residents. More residents can be sampled opportunistically in future health assessments. In late April 2019, we will assess whether females are gravid (via palpation, ultrasound scanning, or X-ray radiography) and transport gravid females to TRACRS to lay eggs, eat, and have a chance to rehydrate before being returned to the recipient site.

When clutches hatch, we will analyze egg-shell DNA (or a small drop of hatchling blood) for individual and clutch paternity to assess genetic assimilation.

There are phenotypic data that suggest potential for assimilation, but are not as demonstrative as genetic assimilation described above. Movement distances or displacement (point to point), home range size and overlap, and indices of site fidelity (based on movement data) indicate how much space and habitat the translocatees share with residents (see Field et al. 2007 and Nussear et al. 2012). If they share these resources simultaneously, not segregated in time, it shows a strong potential for interaction and assimilation. Behaviors detected during tracking and other efforts (e.g., male-to-male fighting, sharing burrows, pacing site perimeters away from other animals), and isolated pockets of healthy animals or diseased animals of one group, also provide indices of isolation, conflict, or assimilation (e.g., lack of fighting, sharing burrows, restricted spread of disease). Home range overlap (% and unit areas), degree of agonistic behavior (number and intensity of bouts), and disease incidence (% clinically ill or ELISA positive) will be compared to those in control groups.

The reproductive output of female desert tortoises may also provide an index of assimilation. Isolated females or females with limited interaction with males can stop reproductive cycling (Gerald Kuchling & Brian Henen, unpublished observations) in captivity. This could happen in the wild if the females do not integrate well with the other group. Based on the Ft Irwin results translocated females may not limit assimilation (i.e., produce offspring with resident males) whereas translocated males may be limited in contributing to clutches of resident females. When we assess health status in spring 2019, we will also assess female reproductive status (gravid, non-gravid, and perhaps vitellogenesis; Henen and Hofmeyr 2003). Reduced cycling or vitellogenesis may take years post-translocation because females contain more than one size class of follicles in their ovaries and may take months to resorb follicles.

Assimilation may take time and will be monitored for change over time. Many of the same independent or predictor variables will be analyzed for assimilation as for survival (see Survival, Data Analysis above), with genetic, behavioral, and spatial (home range size and overlap), and genetic indicators of assimilation for each site. Comparing assimilation among translocatees, residents, and controls is the central question, but we will also analyze for effects of site, sex, health status, habitat condition, and weather.

4.2 OTHER RESEARCH

Although the main focus of a successful translocation is to maximize the survivorship and assimilation of the translocatees and residents, we are proposing five main recovery research questions and will consider other recovery-oriented research. We will perform these studies in concert with the primary survivorship and assimilation analyses, so most of the field and analytical methods outlined in Section 4.1.1, will be used to address these questions.

The five main research topics include:

1. Experimental translocation densities
2. Cattle grazing compatibility with desert tortoises
3. Efficacy of constrained dispersal as a tool for translocation
4. Effects of translocation distance
5. Efficacy of headstarting as a translocation tool

4.2.1 EXPERIMENTAL TRANSLOCATION DENSITIES

The primary emphasis of the translocation density analysis is to evaluate whether areas can support densities (number of tortoises per unit area, e.g., adults per km²) higher than existing densities (Table 6). Densities have declined considerably throughout much of the Mojave Desert (see Section 1.1 above), so habitat in these recipient areas may support higher than current densities. Second, the current guidance (USFWS 2011b) of post-translocation densities (one standard deviation, SD, above the mean for the recovery unit) is deliberately cautious and conservative, but needs experimental testing. For this region, the Western Mojave Recovery Unit, the mean and SD are 2.8 & 0.9 adults/km², respectively (USFWS 2015b).

We will test translocation density increases that are 0.5SE (0.9 adult/km²) to 2.3SE (6.4 adults/km²), or 17% to 100%, higher than current densities (Table 6) to determine if these areas can support higher densities of tortoises.

We will assess survivorship of controls, residents and translocatees as described above (4.1.1), including Kaplan-Meier and contingency table analyses for survivorship of animals monitored primarily via radiotracking but also via mark-recapture plots, health assessments and dispersal area assessments. We hypothesize that survivorship among the groups (controls, residents and translocatees) would not differ among the translocation density categories (translocation densities). The alternative results (or hypotheses) would include translocatee survivorship is lower at the higher translocation densities (consider survivorship plotted against translocation densities (e.g., % or SE increase, Table 6). Resident survivorship may also be lower at higher translocation densities.

Within the context of translocation density tests for sites, we will also consider variation due to other categorical or continuous variables (e.g., sex, age, size, health status, habitat condition, rainfall, or indices of predator abundance). As with Nussear et al. 2012, we will consider AIC_c – based model selection to evaluate models including group, site, sex and other variables.

As described above for assimilation, we will evaluate genotypic assimilation including clutch paternities and genetic distances of offspring relative to the resident condition and translocatee condition (genetic diversity and genetic distance from residents). We hypothesize that offspring paternity and genetic diversity will be mixed intermediates including parents of both resident and translocatee parents, and genetic distances intermediate between resident and translocatee conditions. The number of translocatees relative to residents may influence the frequency of intermediate paternity clutches and average genetic distance between the two groups. These may also change over time, as

described above (Section 4.1.1), but may settle within two years as translocatees settle and develop new site fidelities (Nussear et al. 2012). Hopefully they will settle within the first five years of monitoring (with the larger samples sizes, n=225 per each group). Differences may be more difficult to detect as animals settle, and as radiotransmitter sample size is reduced to 50 per group in year six post-translocation.

We also hypothesize that the phenotypic variation (e.g., movements, home range size, home range overlap, site fidelity measures) of residents and controls will not differ between residents and translocatees within sites, and among translocation densities. If translocation density affects phenotypic variation, we may see differences among controls, residents and translocatee indices of assimilation (e.g., movements, home range size) with translocatees moving more and having different shaped or larger home ranges than residents have (Field et al. 2007, Nussear et al 2012). The differences may also disappear over time as translocatees settle (ca., in 2 years, Nussear et al. 2012).

We will also use various types of ANOVA to analyze for effects of group, sex, size, behavior, health status and other variables that may help explain different levels of phenotypic variation between groups, and between those that survive and those that die.

Each year for the first five years, we will also assess tortoise density via USFWS- (2015b) and TRED-consistent (Karl 2002) methods that have been used to evaluate tortoise density on the expansion areas and Combat Center since 2008.

4.2.2 CATTLE GRAZING COMPATIBILITY WITH DESERT TORTOISES

Grazing may contribute to the decline of desert tortoise populations (USFWS 1994a, 2011a, Boarman 2002). While there is a substantial body of information that shows both long-term and short-term changes to habitats as a result of grazing, the detrimental effects are not consistent and some benefits may accrue (Ellison 1960). Specific to desert tortoises, little definitive and focused research has been completed on the effects of cattle grazing (Avery 1998, Lovich and Bainbridge 1999). In the absence of information, but assuming that grazing is detrimental, landscape-level conservation actions have targeted the closure of allotments and have revised grazing management of other allotments (USFWS 2011a).

Studies to illuminate the specific grazing factors that affect desert tortoises will assist USFWS and CDFW in recovery efforts. These studies also may assist the allotment operator in revising grazing management practices to accommodate both cattle and tortoises, as an alternative to retiring the allotment. Such studies are encouraged by the revised desert tortoise recovery plan (USFWS 2011a:78). The Ord Mountain Cattle Allotment overlaps the Lucerne-Ord Recipient Site, thus providing an opportunity to examine the effects of grazing on desert tortoises. Both historic and current data on tortoise populations and grazing practices are available, thereby permitting an analysis of both long-term and short-term effects. The design of this study is currently under development and should be available to USFWS for comment and approval prior to translocation.

We will measure the same basic survivorship, assimilation, tracking, plot density assessments, health assessments, dispersal area evaluations, habitat characteristics, and secondary or explanatory measurements indicated above. These analyses will be completed in a dispersal area next to a grazing allotment and within the grazing allotment. We will perform the same data analyses and statistical comparisons among groups, residents, translocates, and controls, but also with the comparison of data between grazed and ungrazed areas. We will use more than one control area (e.g., Daggett and Rodman-Sunshine Peak South) to bolster statistical power. Our null hypothesis is that there will be no difference between grazed and ungrazed areas for all of our comparisons.

4.2.3 EFFICACY OF CONSTRAINED DISPERSAL FOR SPECIES RECOVERY

Constrained dispersal is a technique wherein tortoises are translocated to a fenced site to encourage settling before the fence is removed. Unlike simple translocation to unfenced sites where tortoises may travel away from that site, the tortoises remain because they have established home ranges and become part of the social hierarchy within the fenced area. In this way, specific locations can be augmented, a critical feature if translocation is targeting depressed, depleted, or other specific areas. Results from one constrained dispersal study in the western Mojave Desert (Karl 2007) strongly suggest that the technique has merit.

We propose a constrained dispersal experiment to evaluate constrained dispersal as a recovery action, especially for depressed or depleted populations. The Cleghorn Recipient Site will be the single constrained dispersal site. Because the habitat has remained undisturbed in this area the number of tortoises that will be translocated to this site will attempt to result in post-translocation densities that may approximate historic densities. Current data for tortoises ≥ 160 mm indicate densities in the Cleghorn Lakes RTA ranging from 3.2 to 16.5 tortoises/km² (Table 8). The Cleghorn Recipient mark-recapture plot was sited in the square kilometer with the highest indication of tortoise density based on 2015 TRED transects (A.E. Karl, unpub. data). By contrast, the mean density for the West Mojave Recovery Unit (USFWS 2015) is substantially lower than actually observed locally. To maximize translocation success while still examining constrained dispersal as a translocation tool, 52 tortoises will be translocated to the constrained dispersal site. This is based on mean density measured during clearance surveys.

The Combat Center will install temporary tortoise exclusion fencing around the site perimeter (see Section 3.4.1, above, for fencing details). All tortoises in the constrained dispersal study will be transmittered and monitored for survival, assimilation, movements, home ranges, health, disease, and additional explanatory variables (e.g., demographics, predator indices, and weather), identical to the methods and schedule identified above (Section 4.1.1). Tracking will follow the schedule for all telemetered tortoises in the translocation program to support collecting data on locations, movements, burrow use, and behavior. The Combat Center will remove the tortoise exclusion fencing two years after initial translocation to permit tortoises to join the greater population.

Repatriation will be assessed by continued monitoring of subsequent tortoise movements and comparing them to those of control tortoises at the Cleghorn Control Site. Tracking will end at Year 10, consistent with the cessation of tracking on the larger telemetered group.

Table 8. Tortoise density data at the Cleghorn Lakes RTA and the number of tortoises that can be translocated into the Cleghorn Constrained Dispersal Site based on a 100% increase in population size. Density is calculated from two mark-recapture plots and clearance surveys in the SEA impact area¹. Mean density for the West Mojave Recovery Unit (USFWS 2015b) is provided for comparison.

Source	Current Tortoise Density (Point Estimate) (tortoises / km ²)	Post-Translocation Density-100% Augmentation (tortoises / km ²)	Alternatives for Number of Tortoises to be Translocated for 9.2 km ² Constrained Dispersal Site
Cleghorn Recipient Mark-Recapture Plot (2015)	16.5	33.0	16.5 * 8.1 = 134
Cleghorn Control Mark-Recapture Plot (2015)	12.1	24.2	12.2*8.1 = 99
Clearance Surveys for 12 km ² (2015)	Mean = 6.4 (3.2-11.8)	12.8	6.4*8.1 = 52 (selected)
West Mojave Recovery Unit Mean	2.8	5.6	2.8*8.1 =23

1. Density is the number of tortoises found in each full survey cell, assuming 74% of tortoises found on each pass, 93% cumulative.

We will record the same variables and complete the same analyses as for other sites. However, we anticipate that the constrained dispersal may expedite rates of assimilation, development of site fidelity, and home range overlap compared to the control site and other sites; we may advance comparisons to earlier periods compared to other experimental analyses. After the eastern fence is removed in 2018 or 2019 we anticipate very little additional dispersal will occur, as residents and translocatees will have settled inside the pen with their new neighbors. Still, we must document this settling and site fidelity by continued monitoring of transmitted animals (circa 20 tortoises per group during the first five years) and untransmitted animals in surveys.

4.2.4 EFFECTS OF PHYSICAL AND GENETIC DISTANCE

Translocation risks mixing tortoises with different genotypes (see review and analysis by Averill-Murray and Hagerty 2014) and phenotypes, although the former is typically emphasized when evaluating translocations. In this translocation, we have the opportunity to evaluate both over a relatively short distance (<100 km). See Section 4.1.2, above, for additional details, especially concerning metrics besides genetic distances.

We have mapped genetic distances among tortoises of the WEA, SEA, and a few additional areas within the Combat Center. Similar to early studies (Murphy et al. 2007, Hagerty et al. 2011, Averill-Murray and Hagerty 2014), there is a general pattern of

divergence by distance (Rico & Murphy, unpubl data), with sites near the WEA clustering, sites near the SEA (Cleghorn Lake & Bullion RTA) clustering, but genetic distance substantial between the Bullion RTA and some WEA tortoises. The Cleghorn recipient area is about 50 to 70 km from the WEA tortoises, and about 3 km from the SEA impact area tortoises, the latter probably linked to the Bullion RTA via the Cleghorn Lakes Wilderness (Figure 2b). Both of these distances are much less than the more than 200 km recommended physical limit for translocation before incurring a risk of outbreeding depression (Averill-Murray & Hagerty 2014). This is an opportunity to evaluate the relative success of translocating tortoises with some physical and genetic distance. With data collected during survivorship monitoring (see Section 4.1.1, above), we could compare data among the controls and translocates for patterns of mixing or segregation.

Having the DNA samples from the tortoises will also allow us test whether clutches produce offspring that are segregated or mixed among the WEA, SEA, and residents, and quantify the amount of mixing (see Assimilation, above). We would test this at about three years post-translocation, after tortoises have had time to settle. In late April 2019, we will collect gravid females and analyze eggshell DNA, as detailed in Section 4.1.2, above, to assess genetic assimilation. We will repeat this prior to removing transmitters at the five year mark, and on subsets of translocatees that are monitored for the ten year period.

Our analyses will evaluate the effect of translocation distance on degree of assimilation. However, shorter translocations are likely to be less distinct genetically (shorter genetic distances, F_{ST} , between populations) and more difficult to distinguish offspring from either parent population.

We will record the same variables and complete the same analyses as for other sites and research questions. We hypothesize (null hypothesis) that there will be no significant differences between groups, sites, and sexes for most variables including survivorship, movements, site fidelity, demographics, and health. Also, the assimilation measures will be similar among sites, with the exception of the degree of genetic diversity among offspring, and perhaps the net genetic distance of sites relative to other sites. As genetic distance tends to be correlated to physical distance between sites, we anticipate little net increase in offspring genetic diversity at recipient sites close to donor sites (e.g., Cleghorn relative to Cleghorn impact areas) but a larger increase in offspring genetic diversity with more disparate sites. Between close sites, it may be difficult to measure statistical differences in net diversity change because both sites should already be similar, at least compared to sites separated by greater distances.

4.2.5 THE USE OF HEADSTARTING IN TRANSLOCATION

The Combat Center is researching the efficacy of headstarting using long-term efforts. We may supplement these headstart data by monitoring the survivorship, growth, and health of small tortoises to be translocated. Almost nothing is known of the survivorship

of juvenile tortoises, and these data for small tortoises will provide a comparison to the wild juvenile, translocatees, residents, and controls being monitored (35 per group).

The Combat Center is holding, protecting, and feeding 235 small, WEA & SEA tortoises at the TRACRS headstart facility because these tortoises are too small to receive radiotransmitters, and would be nearly impossible to find again in the clearance surveys. We will monitor their survivorship, growth, condition, and disease status at the facility and after the translocation. These data will be compared to those of large and small translocated, resident, and control tortoises. However, the post-translocation data for holding pen tortoises will be most robust for the largest tortoises (ca. 30) that we fit with radiotransmitters prior to their translocation.

We will measure and analyze the same survivorship, movement, dispersal, behavior, burrow use, growth, and health for comparing adults and juveniles in the initial translocation. We hypothesize the headstart animal data will be similar to that of residents and controls of similar body sizes (e.g., near 120mm carapace length [CL]). We also hypothesize that juvenile survivorship, movement, and dispersal will be lower than that of adults and large juveniles (ca. 160 mm CL) of all groups for each site. This may be explained by body size effects (e.g., surface to volume ratios) if larger tortoises experience higher survivorships, and larger tortoises perform better (e.g., survivorship, body condition scores and being healthy) in drought seasons and years. These data will be analyzed via the same statistical methods as indicated above for survivorship and other research questions, but assimilation measures would be restricted to phenotypic variables since these animals will not be reproductive. We may repeat similar levels of monitoring for additional cohorts of the headstarted animals, but may release some without transmitters after headstarting them to 100-120mm CL. As described for all translocatees, we will document the survivorship and other data of these released, holding-pen tortoises when we find them opportunistically or in mark-recapture plot and transect surveys.

5.0 PHYSICAL PROCESSES OF TRANSLOCATION

5.1 TORTOISE COLLECTION AND PROCESSING

Translocation in 2016 will occur in very early spring, shortly after tortoises become active. Tortoises must have adequate time to find or dig new refuges in the unfamiliar recipient areas prior to the onset of lethal surface temperatures, roughly 43-45°C (Zimmerman et al. 1994, Karl unpub data). Translocation can only occur if ambient temperatures will not exceed 35° (95°F) within one week of release and 32°C (90°F) within three hours of release (USFWS 2011b). Translocation in future years may occur in early spring or fall, in accordance with published guidelines (USFWS 2011b).

To meet the temperature goals, we expect to translocate approximately 100 tortoises per day, completing the translocation for the 1,138 tortoises by the end of the first week in April (or earlier if temperatures are unusually warm). Authorized handlers (see Section 6.1, below) will find and collect the tortoises, which will have been radio-tracked within one week prior to facilitate finding them. All tortoises will be transported in individual,

disinfected plastic tubs with a lid and brought to local processing centers, where they will receive a visual health assessment. Any tortoise with clinical signs of disease will be transported to the TRACRS holding pen and not translocated (USFWS 2012), unless notified otherwise by USFWS. Transmitters will be removed from the tortoises that are not part of the study.

Depending on environmental conditions and hydration states, tortoises to be translocated may need to be hydrated within 12 hours before release, according to existing protocols (USFWS 2011b). The latter may include soaking in shallow water or epicoelomic injection of sterile saline or nasal/oral administration of drinking water at rates identified in USFWS (2015a). Tortoises <100mm will only be offered fluids nasally or orally. We will record the tortoise's mass before and after this procedure. Should a tortoise void, it will be re-hydrated using these techniques and rinsed thoroughly to remove predator-attracting odors.

5.2 TORTOISE TRANSPORTATION AND RELEASE

Each tortoise will be boxed and walked or driven to one of several dispatch points, where groups of tortoises will be flown by helicopter (preferably) or driven to a drop-off point at the relevant translocation area, according to the approved disposition plan for that tortoise. Biologists will carry the tortoises from the drop-off point to release them at designated release sites. During all transportation, tortoises will be kept shaded, away from hot surfaces, and padded as needed to avoid shell or internal trauma.

All tortoises will be released in a spatial distribution similar to capture distribution, placed under shrubs, and the UTM coordinates recorded. Juvenile tortoises are highly vulnerable to predation and require special consideration for successful translocation. Small tortoises will be released in the morning to avoid inadvertently attracting nocturnal predators to a release site. All juveniles will be released near inactive rodent burrows or other protective cavities.

6.0 PROCEDURES APPLICABLE TO ALL ACTIVITIES

6.1 AUTHORIZED HANDLERS

USFWS describes a single designation for biologists who can be approved to handle tortoises - "Authorized Biologist" (AB) (http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/dt; USFWS 2009a). Such biologists have demonstrated that they possess sufficient desert tortoise knowledge and experience to handle and move tortoises appropriately. Specific ABs will be approved to perform specific tasks, including such specialized tasks as health assessments, blood sampling, and transmitter attachment. Only those biologists authorized by USFWS and CDFW can perform specific tortoise handling tasks and clearance surveys. For USFWS, ABs are permitted to approve specific desert tortoise monitors (BMs) to assist in certain tasks, at the AB's discretion, without further approvals from USFWS. Direct supervision of monitors by the AB (i.e., voice and sight contact) is required for all clearance surveys and certain

other specialized tasks. All ABs will be authorized via permits from USFWS (TE17730-5) and CDFW (Scientific Collecting Permit [SCP] 10112).

6.2 HANDLING TECHNIQUES AND TEMPERATURES

All tortoise handling will be consistent with NREA permits and the BO (USFWS 2012) and will be accomplished by techniques outlined in the USFWS *Field Manual* (2009b: Sections 7.6-7.8), including the most recent disease prevention techniques (e.g., USFWS 2015b). Handling time will be minimized to the extent possible to avoid stress to the animals. Handling will adhere to USFWS (2010b) handling temperature guidelines; tortoises may be handled only when air temperature measured at 5 cm (2 in) above the ground (shaded bulb), is not expected to exceed 35°C (95°F) during the handling session. If the air temperature exceeds 35°C during handling or processing, desert tortoises will be kept shaded in an environment where the ambient air temperatures do not exceed 32.7 °C (91°F) and air temperature does not exceed 35°C.

6.3 HEALTH ASSESSMENTS

Methods detailed in *Health Assessment Procedures for the Desert Tortoise (Gopherus agassizii): a Handbook Pertinent to Translocation* (USFWS 2016b) will be followed for all sampling techniques and equipment. Health assessments and tissue collection will not occur until after 15 May or four weeks from the time individual tortoises have become active after winter brumation, unless approved by USFWS (USFWS 2015a).

Mycoplasma agassizii, *M. testudineum*, and herpesvirus are the major pathogens currently being sampled, but other pathogens may be tested as their evaluation techniques become validated for desert tortoises. Blood samples will be taken via subcarapacial venipuncture; oral mucosa will be sampled with oral swabs. A physical examination, including the oral cavity, will focus on clinical signs of disease, body condition, and ectoparasites. Careful attention will be paid to sample collection, processing, storage, shipping, and disease transmission to optimize the sampling program and minimize any risks to tortoises. If a tortoise voids, it will be re-hydrated using permitted methods (USFWS 2015a).

6.4 TRANSMITTERS

Larger tortoises (≥ 160 mm in carapace length [MCL]) will receive Holohil RI-2B transmitters (24 mm wide by 11 mm thick; 15 g; www.holohil.com). Large juvenile tortoises will receive small RI-2B transmitters (6 g) and small juveniles that are large enough to transmitter will be affixed with Holohil PD2s (2-4 g). All transmitters will be appropriate for the tortoise's size, shell shape, and mass, and in no case will be greater than 10% of the tortoise's mass. Transmitters will be epoxied to a carapace scute using five-minute gel epoxy. For males and juveniles, transmitters generally will be affixed to the fifth vertebral; for females and large juveniles believed to be females, transmitters will be affixed to the anterior carapace in the most appropriate location for the animal's shell shape that will preclude interference with righting. The transmitter antenna will be fed through a plastic sheath with a diameter slightly greater than the antenna. This sheath

will be epoxied low on the carapace, just above the marginal scutes, and split at the scute seams (growth areas). This technique will permit the antenna to slip freely in the sheath, thereby precluding distortion on growing tortoises. Because the antenna sheath may be tightly curved on a very small tortoise, potentially constricting antenna movement with subsequent growth distortion, much more of the antenna will remain free on small tortoises, including only being attached on the fifth vertebral to minimize torque on the battery. Transmitters will be changed as necessary, earlier than battery life suggests or when the units appear to be malfunctioning. We will record transmitter details (manufacturer, serial number, frequency, installation, and all change dates) for all tortoises and submit this spreadsheet with the annual reports to USFWS and CDFW.

6.5 TORTOISE MORTALITIES

Should a transmitted or translocated tortoise die, the cause of death will be determined to the extent possible. NREA will submit this information and the tortoise location to USFWS and CDFW verbally within 48 hours, or via e-mail within five business days. In the annual report, (see Section 8.0, below), the Combat Center will provide a detailed accounting of all mortalities, circumstances, and actions implemented to prevent similar instances in the future (USFWS 2012). Fresh carcasses may be salvaged and necropsied upon direction from NREA.

7.0 FUTURE CLEARANCES

Fencing is not proposed for the high and medium impact areas to exclude tortoises from entering the impact areas. Consequently, additional clearance surveys are required in subsequent years to minimize tortoise losses. During each year, clearance surveys will be performed on any square kilometers in the impact areas that had three or more tortoises in the previous clearance (USFWS 2012). All clearances will be consistent with methods described above. For any tortoise found, the standard measurements and assessments that were used on other tortoises will be completed and the tortoise numbered and transmitted. All tortoises that are suitable candidates for translocation, based on the health assessment, would be translocated to designated recipient sites in accordance with the approved disposition plan for each tortoise.

8.0 REPORTING

On January 31 of each year (USFWS 2012), the Combat Center will provide a full accounting of all activities associated with the translocation program, both for the calendar year and cumulatively, plus analyses undertaken relative to the effectiveness of the translocation program. The report will include metadata consistent with NREA's recovery permits (TE-017730-5 and SCP 10112). The Combat Center will also engage USFWS and CDFW via telephone at least quarterly to keep the agencies involved and informed, and implement contingency measures in the event unanticipated problems arise (e.g., mortality events, heightened predation).

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Appendix A: Sample Size and Power Analysis

The Biological Opinion (USFWS 2012) estimated the required sample size, 675 [with 190 adult and 35 juveniles in each group, controls (C), residents (R), and translocatees (T)], necessary to evaluate the survivorship and other measures on animals to be monitored via radiotelemetry. Kaplan-Meier survivorship analyses, with log-rank test comparisons among groups, indicate 900 monitored tortoises (i.e., 900 in each group) are necessary to distinguish statistically the annual survivorship rates of the C, R, and T as modelled for the respective 19%, 21% and 25% mortality rates experienced in 2008, a drought year in the Mojave Desert (Esque et al. 2010; see Figure A1). A sample size that large is prohibitive, and likely explains the lack of difference among groups in the 2008 study. If the model reduces mortality of the Controls to 10% (perhaps due to a year of moderate rainfall), but not the Resident or Translocatee mortality, the sample size required is reduced greatly (ca. $n=60$ to 120 per group depending on the two or three group comparisons; Figure A2). Sample size is reduced further to 40 or 60 animals per group per log-rank test (Figure A3) when modelling 5% mortality in Controls (perhaps a high rainfall year) with the same mortality for Residents and Translocatees. Under the latter two scenarios, the sample size of 675 will be able to document statistical differences as a whole, and among most paired sites if at least 40 or 60 animals are monitored per group. Sites with 20 animals or less per group would produce statistically significant results only if there are large differences between groups (more extreme differences than the 5% for Controls and 25% for Translocatees).

Similarly, data for 675 tortoises will provide high power (> 0.8 or 0.9 , conventional values, and higher) in Analyses of Variance (ANOVA) on parameters measured for each individual (e.g., ratio-scale parameters such as space use and overlap; Figure A4) but compared for effects among the three groups and several sites. The example modelled results for overlap of space use among tortoises in another recent translocation (Farnsworth et al. 2015; but see Figure A4 for details). ANOVA provide post-hoc tests to evaluate differences among each group and site (e.g., all sites whether recipient or control); repeated measures ANOVA (not modelled) provide even stronger analyses. Sample sizes of 675 should have statistical power approaching the maximum (one) for many individual-based, ratio-scale measures (e.g., body condition, home range, or home range overlap), with post-hoc results identifying statistical differences among individual sites and groups.

Figure A1. Relationship of p -value to sample size for each of three groups, Controls (C), Residents (R) and Translocatees (T), when annual mortalities are 19%, 21% and 25% respectively (percentage examples from a drought year, Esque et al. 2010). Survival analyses based on equal samples sizes per group, and assume a 5% censorship (loss of animals to transmitter failure or emigration; % estimate approximate from MCAGCC's current monitoring effort for adults). Model mortalities occurred in March, May, July and October, i.e., parts of the active season, and were modelled for the same months among groups. Panels indicate the p -values for the log-rank test comparison a) among the three groups (C, R, and T) and b) between the C and T. P -values drop below 0.05 when the total number of radiotelemetry-monitored animals per group reached 1000.

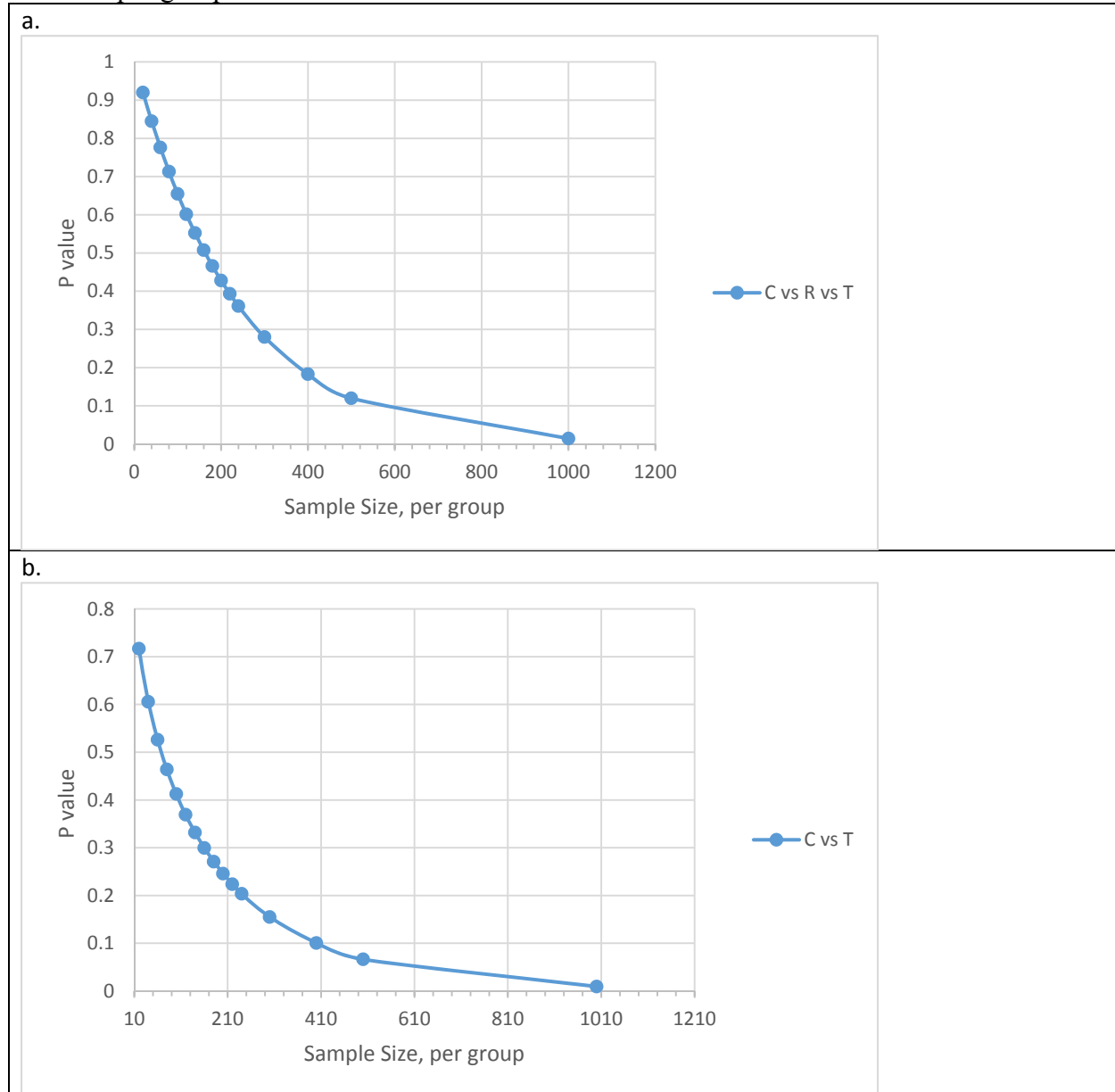


Figure A2. Relationship of p -value to sample size for all three groups, Controls (C), Residents (R), and Translocatees (T) when annual mortalities are 10%, 21%, and 25%, respectively--percentages that might occur for a moderate rainfall year for controls. Values are the same as Figure A1 except that Controls are at 10% mortality and occurring in only March and July. Survival analyses based on equal sample sizes per group, and assume a 5% censorship (loss of animals to transmitter failure or emigration). Other group mortalities modelled to occur in March, May, July and October, i.e., parts of the active season, and were modelled for the same months among groups. Panels indicate the p -values for the log-rank test comparison a) among the three groups (C, R, and T) and b) between two groups (C vs T or C vs R). P -values drop below 0.05 when the number of radiotelemetry-monitored animals exceeded 100 (C vs T vs R), 60 (C vs T) or 120 (C vs R) per group.

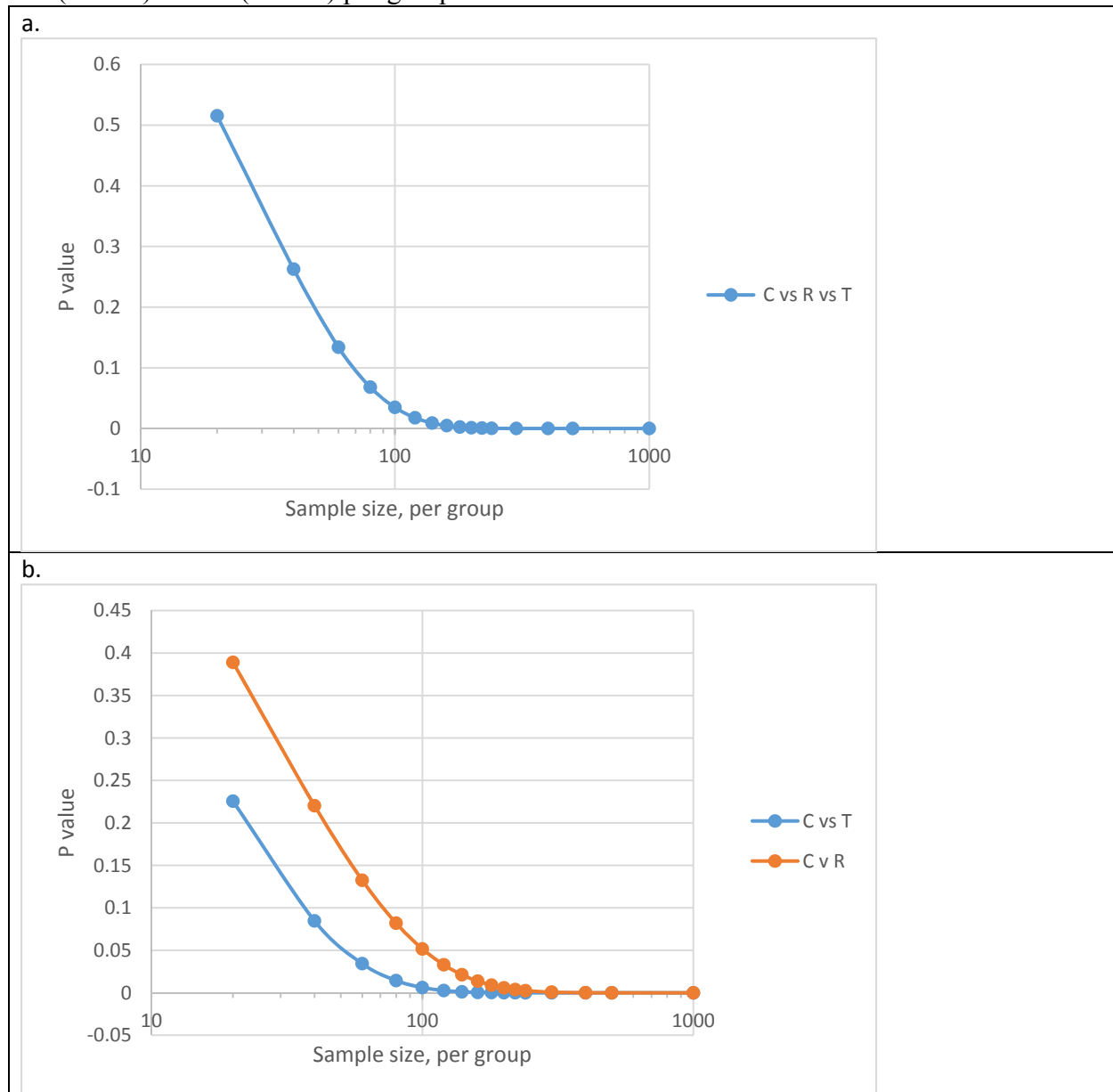


Figure A3. Relationship of p -value to sample size for all three groups, Controls (C), Residents (R) and Translocatees (T) when annual mortalities are 5%, 21% and 25% respectively, percentages for a modelled above-average rainfall year for controls. Values are the same as Figure A1 except that Controls are at 5% mortality and occurring in only March. Survival analyses based on equal samples sizes per group, and assume a 5% censorship (loss of animals to transmitter failure or emigration). Other mortalities modelled to occur in March, May, July and October, parts of the active season, and were modelled for the same months among groups. Panels indicate the p -values for the log-rank test comparison a) among the three groups (C, R, and T) and b) between two groups (C vs T or C vs R). P -values drop below 0.05 when the number of radiotelemetry-monitored animals exceeded 60 (all three groups at 60 per group), 40 (C vs T) or 40 (C vs R) per group.

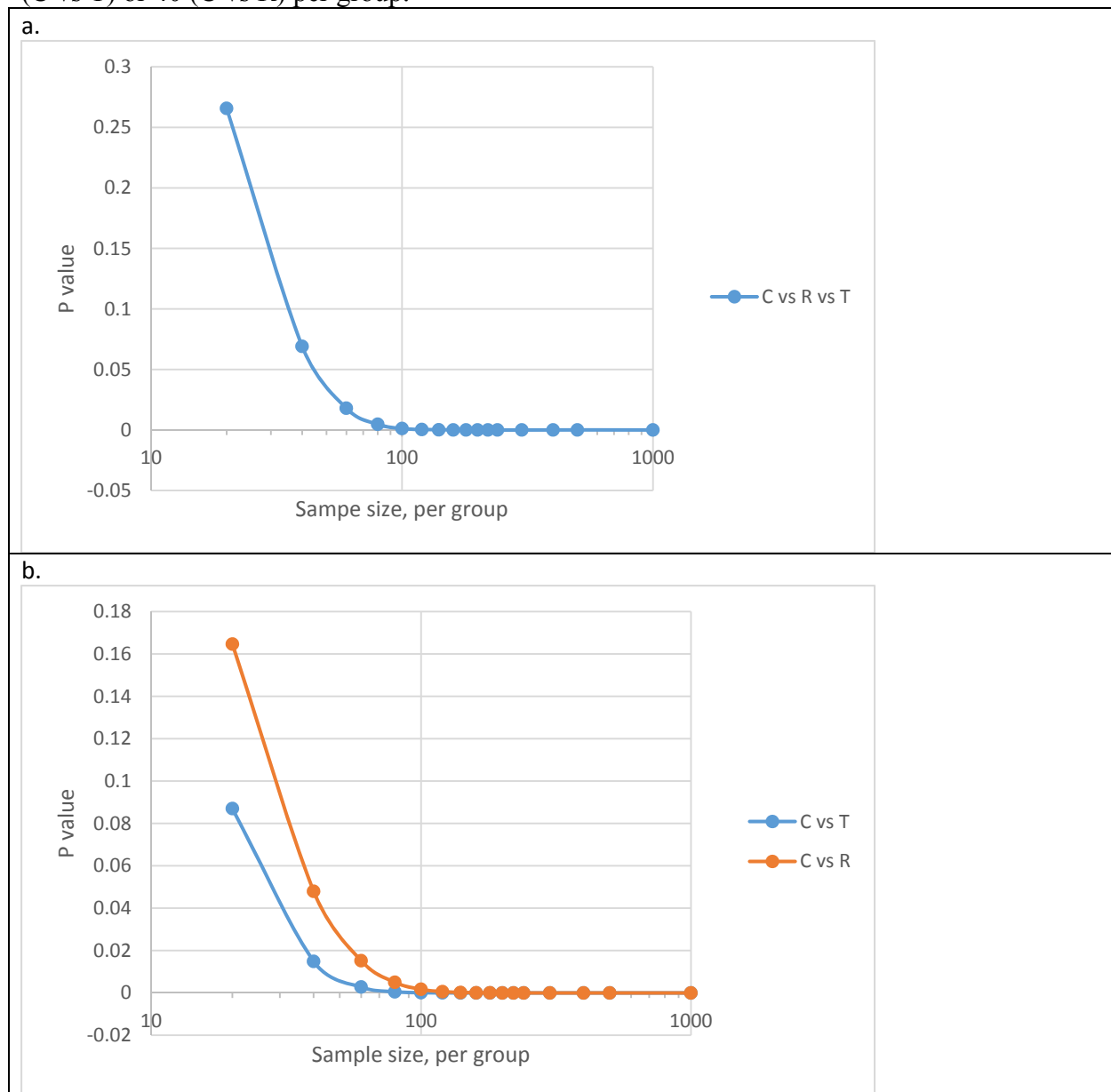
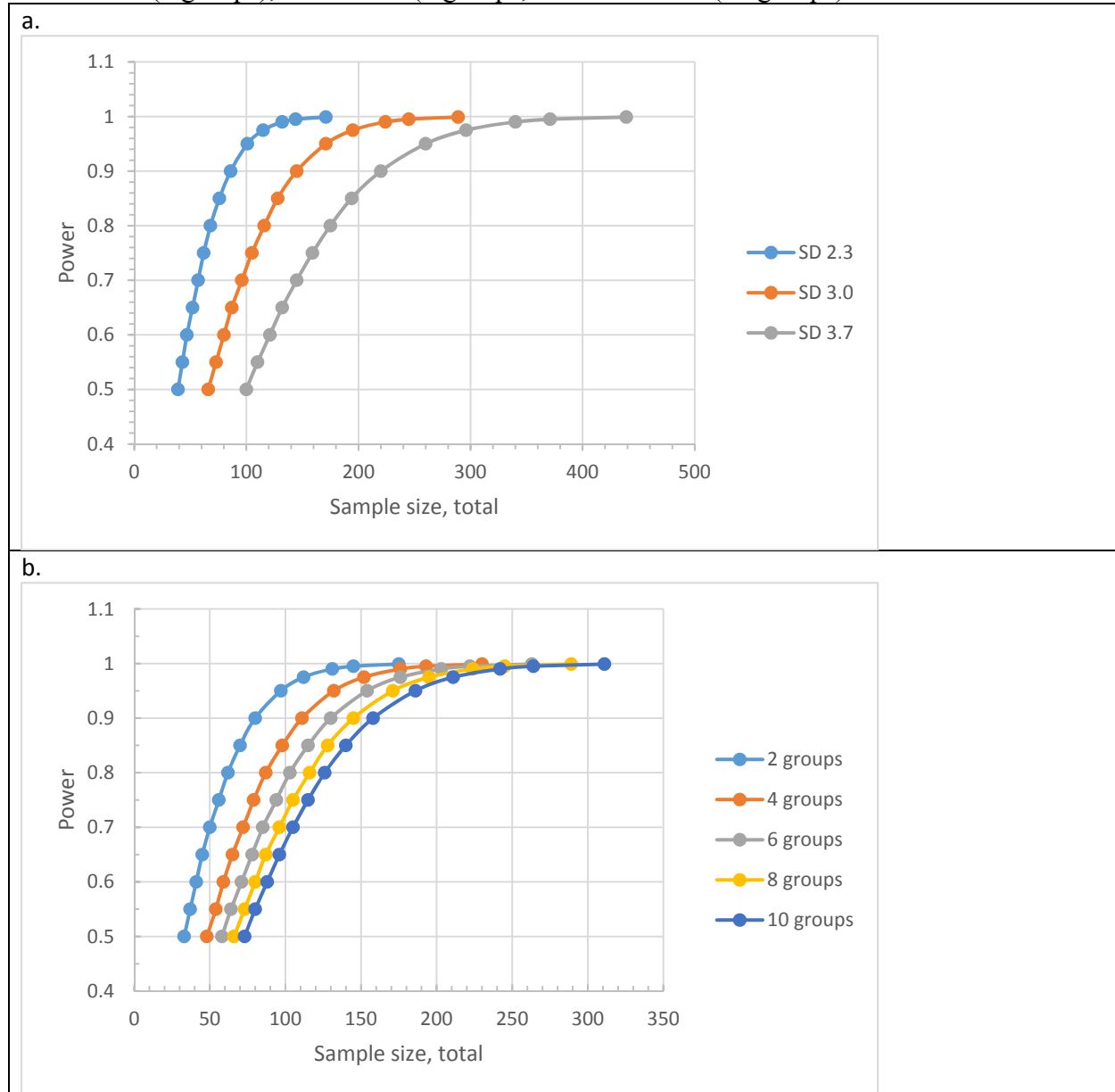
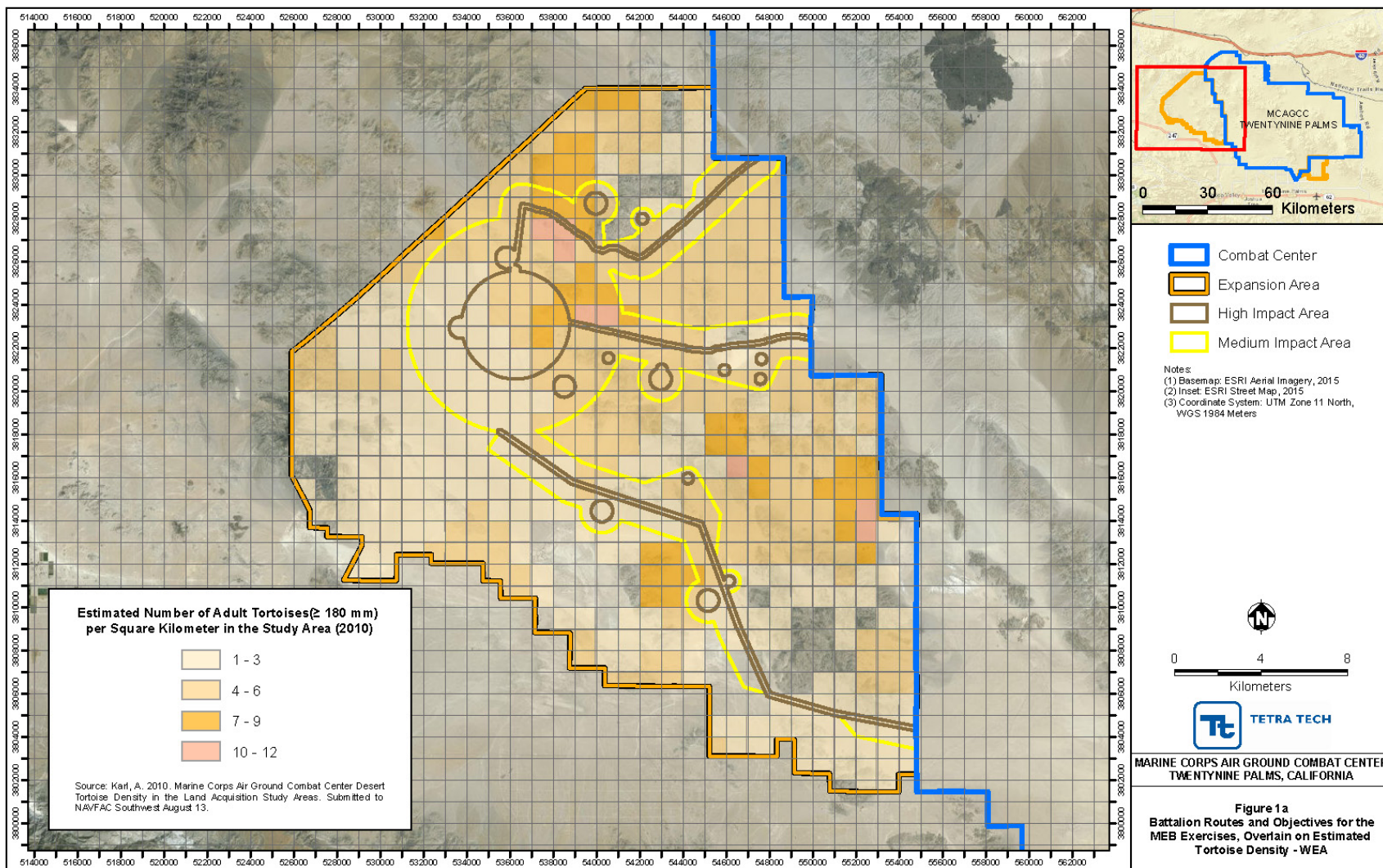


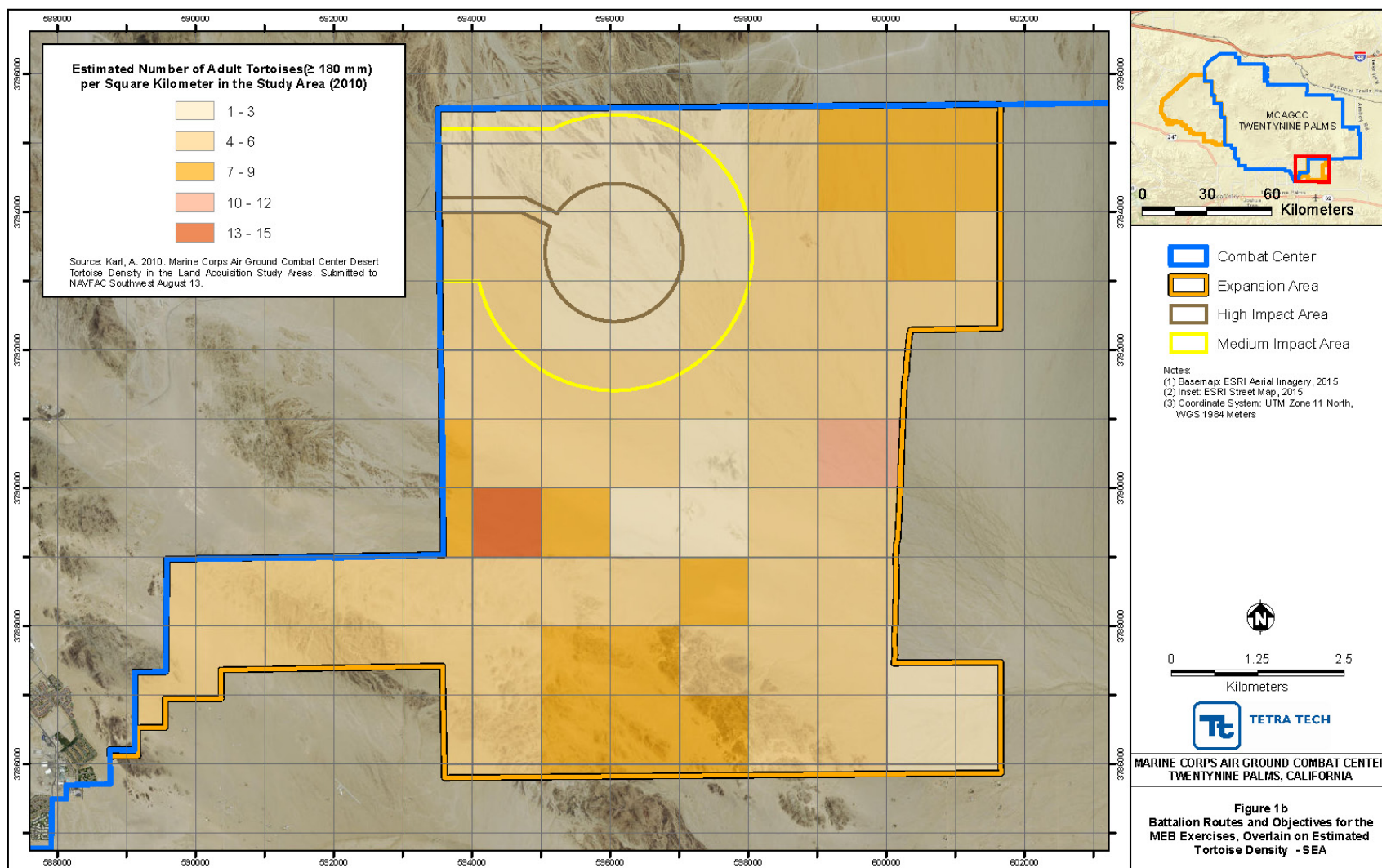
Figure A4. Power of ANOVA for detecting group differences among percent overlap in activity areas (i.e., utilization distributions in Farnsworth et al. 2015) as affected by total sample size (all groups in total for each ANOVA), average standard deviation of groups (panel a) and number of groups studied (panel b). All comparisons are for detecting a 1.5 difference in mean percent overlap, and an alpha or $p \leq 0.05$. Model represents analysis compiled from individual animal data, and is only crudely estimated from Figure 4 of Farnsworth et al. 2015. Commonly used power values are 0.8 or 0.9. For panel a, power values of 0.8 and 0.9 are reached at samples sizes of 68 & 86 (SD=2.3), 116 & 145 (SD=3.0) and 175 & 220 (SD=3.7). For panel b, power values for 0.8 and 0.9 are reached at samples sizes of 62 & 80 (2 groups), 87 & 111 (4 groups), 103 & 130 (6 groups), 116 & 145 (8 groups), and 126 & 158 (10 groups).

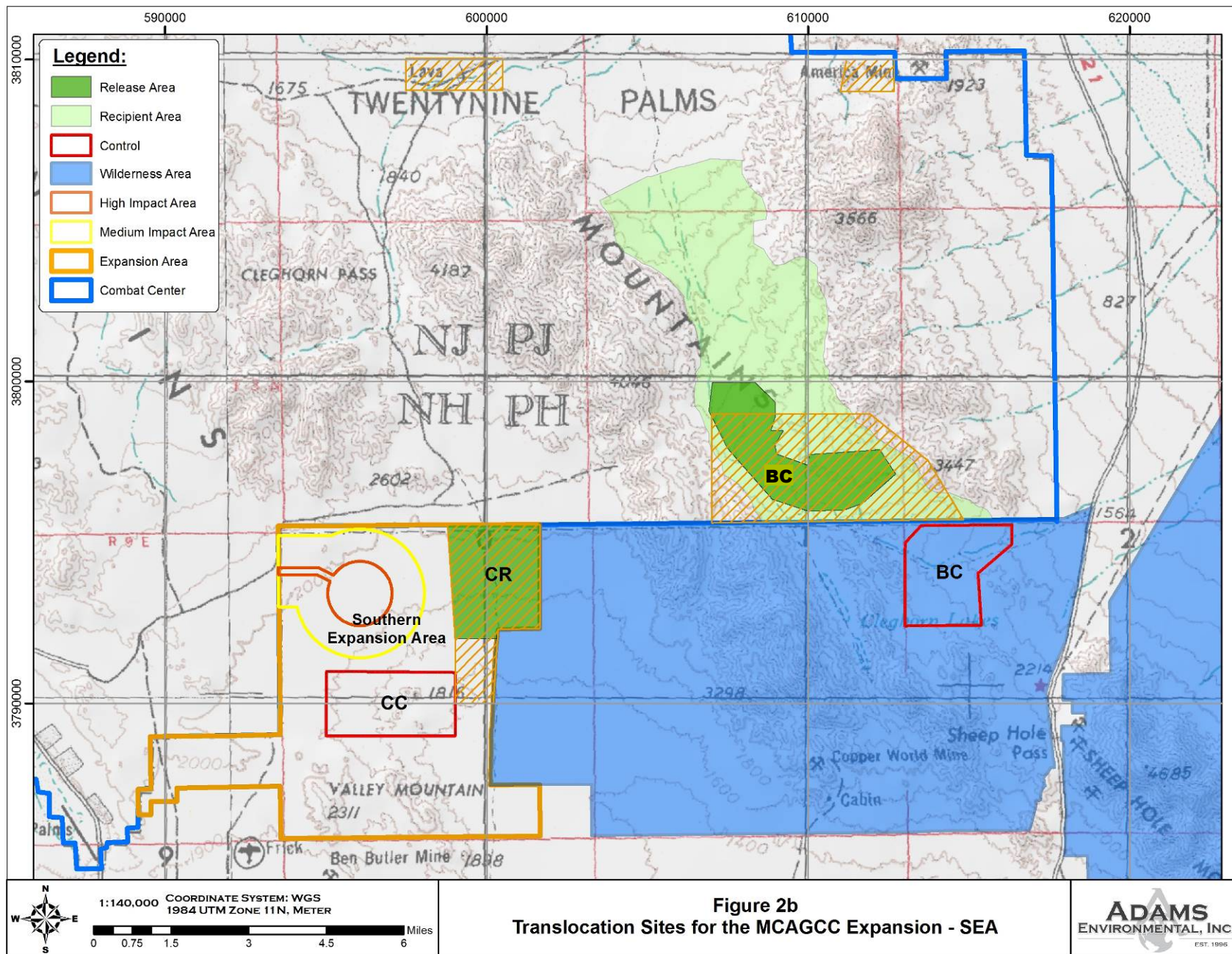


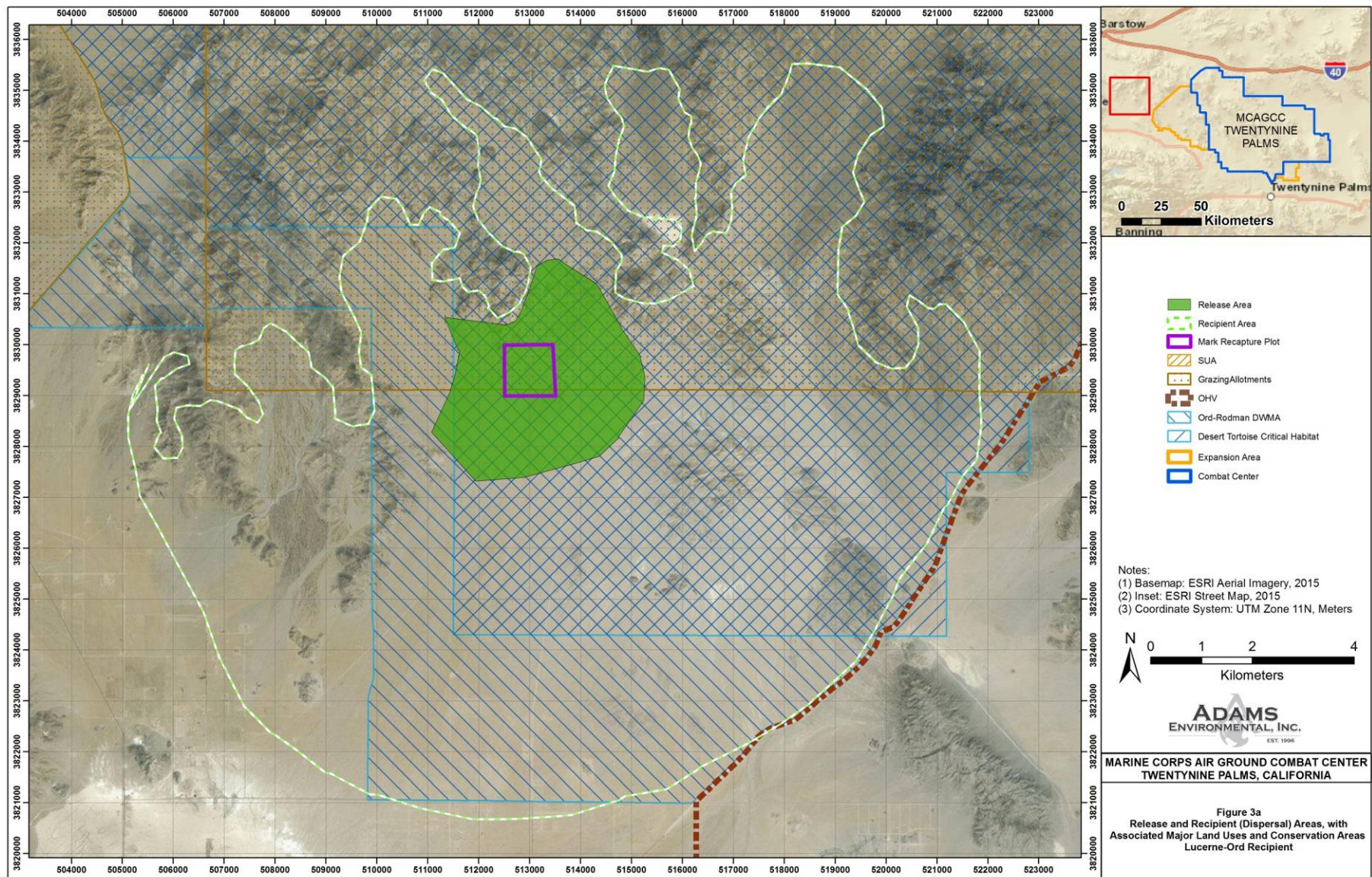
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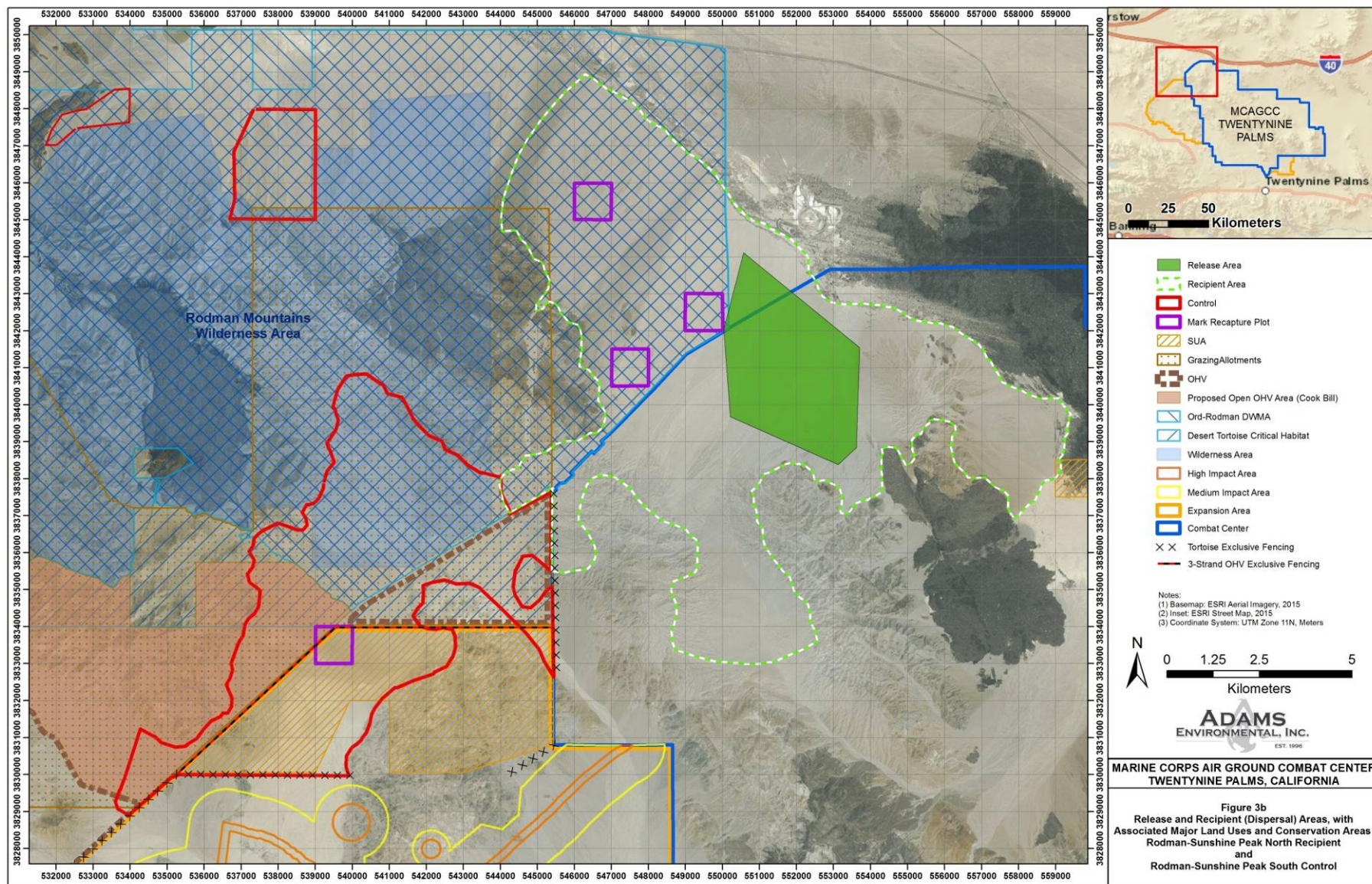
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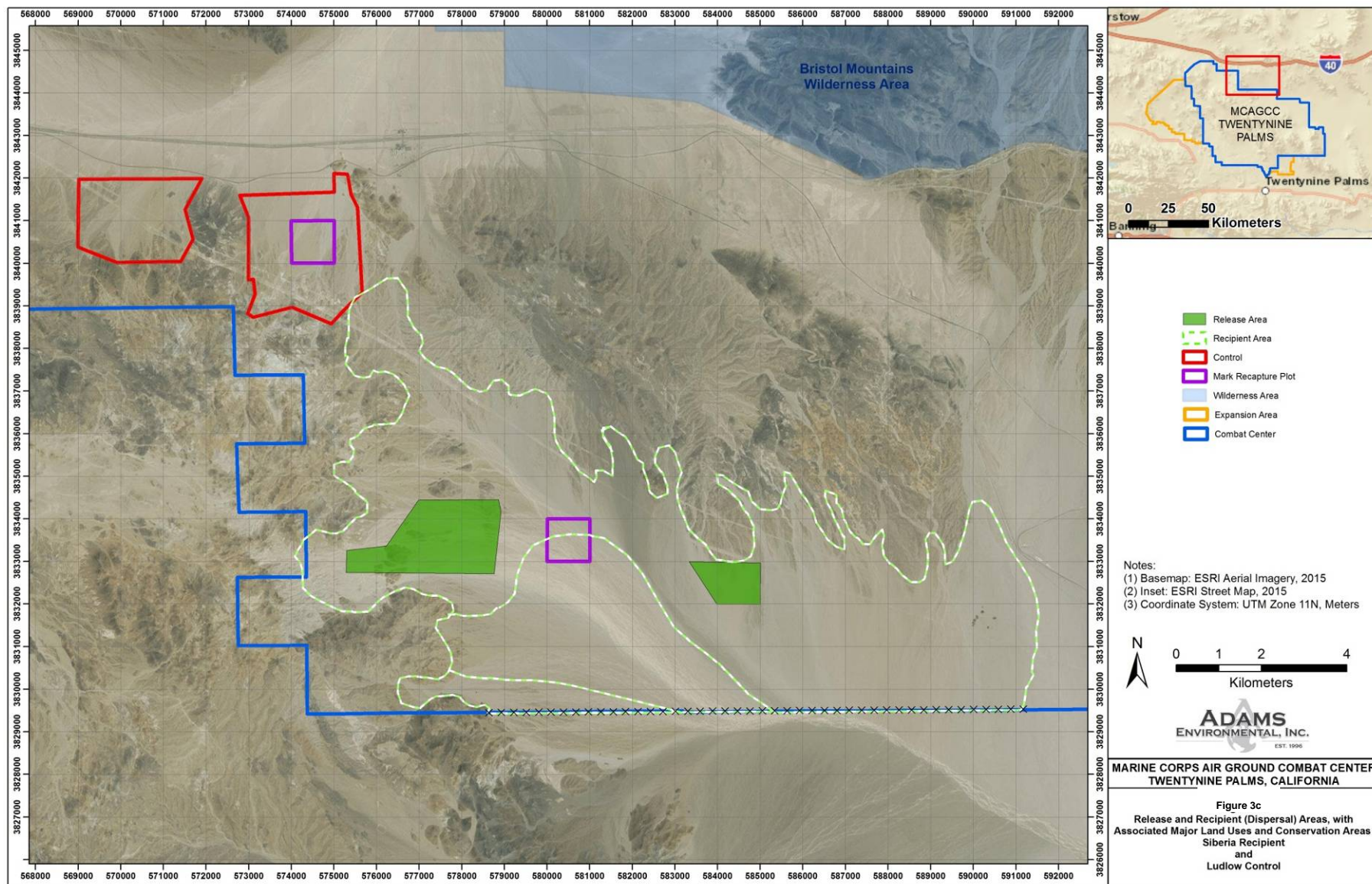


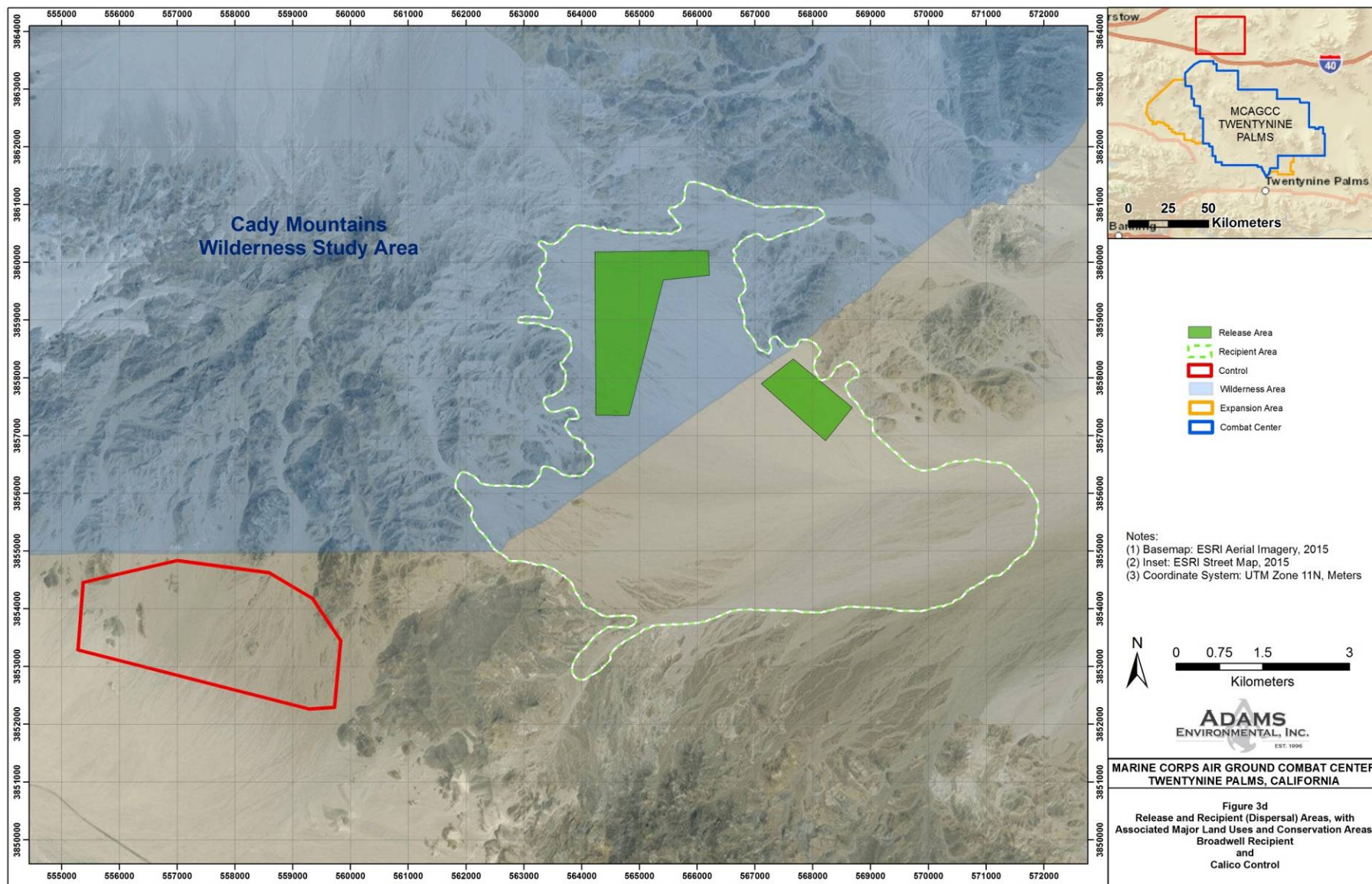


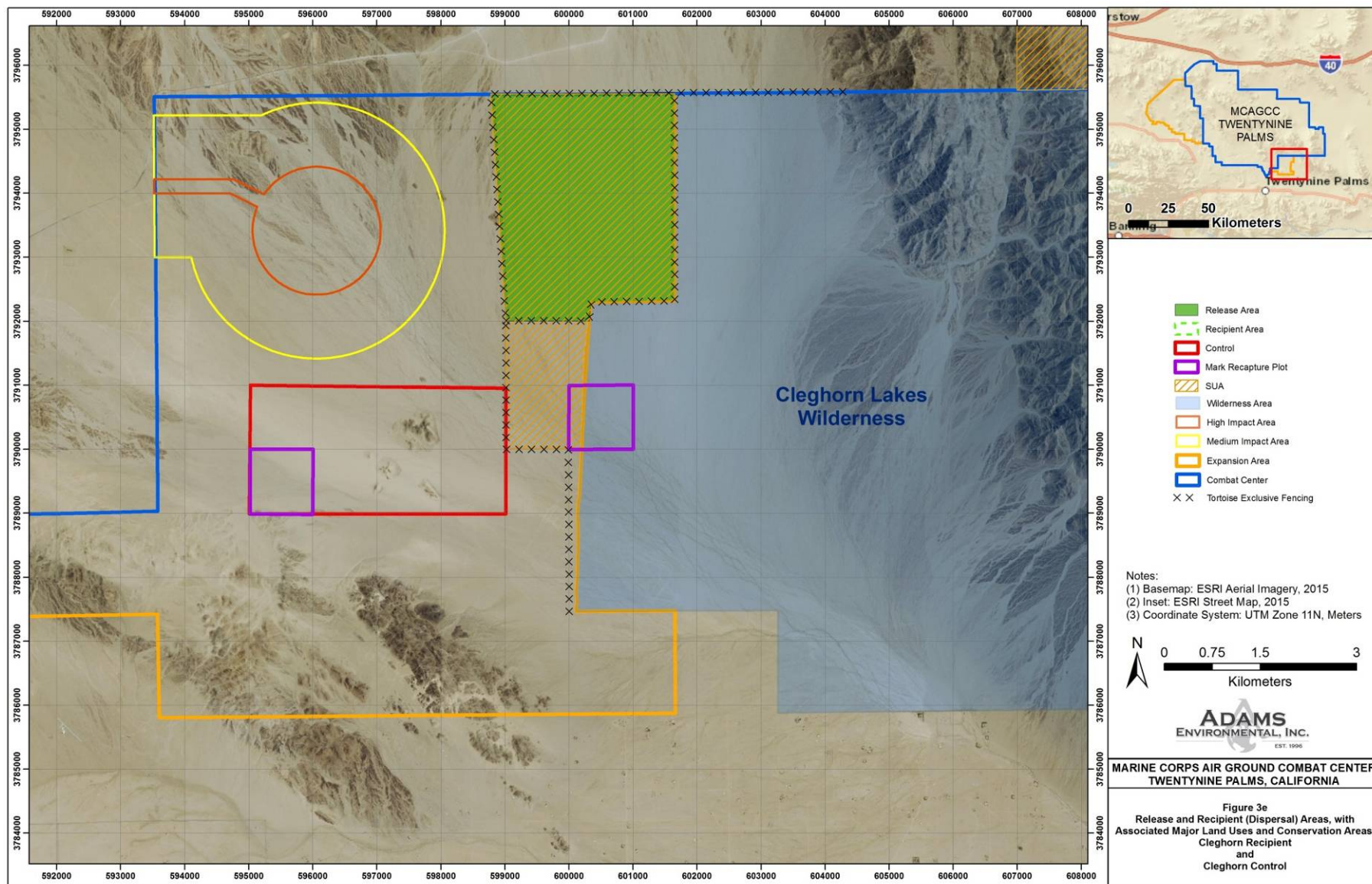


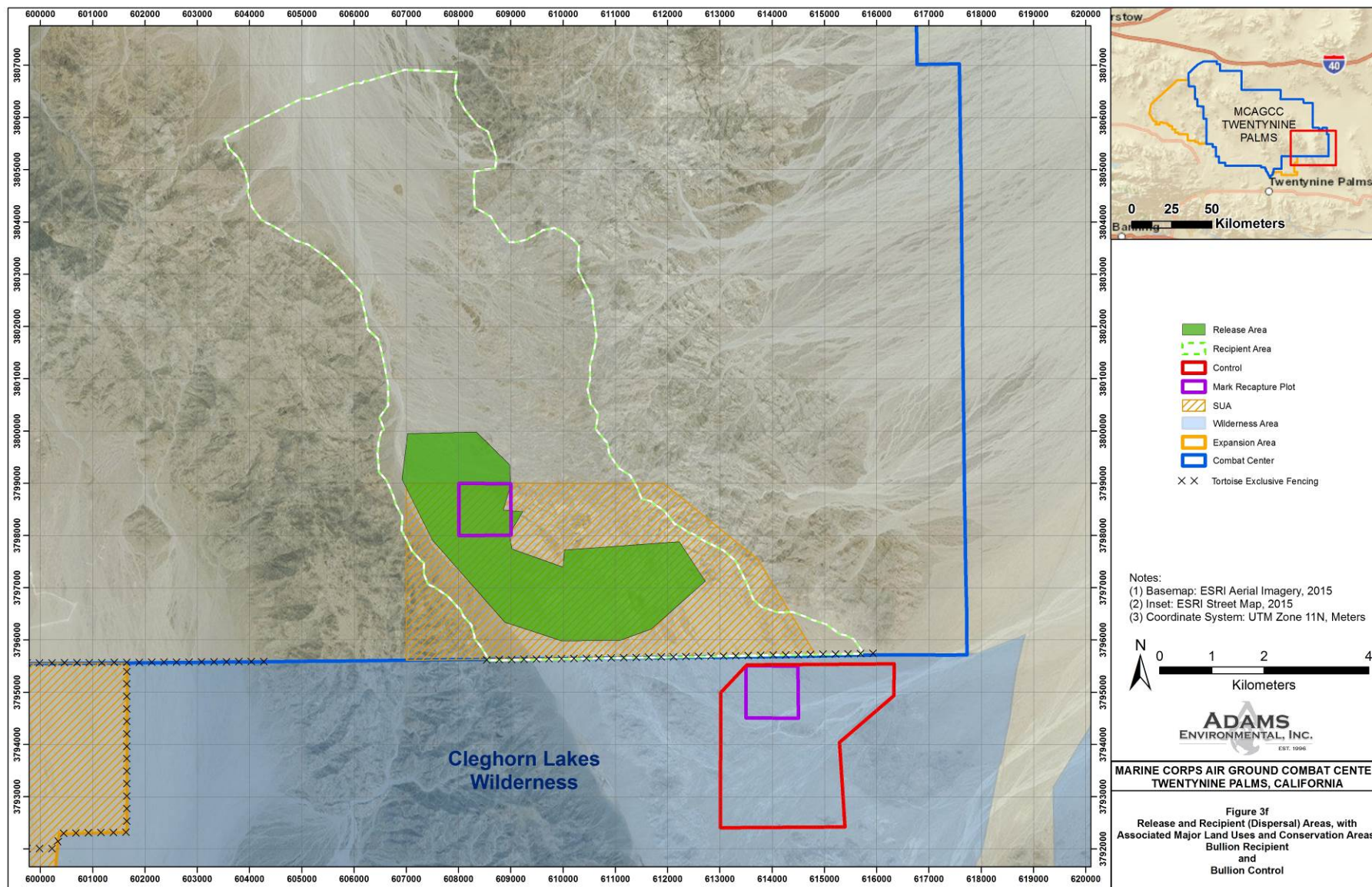


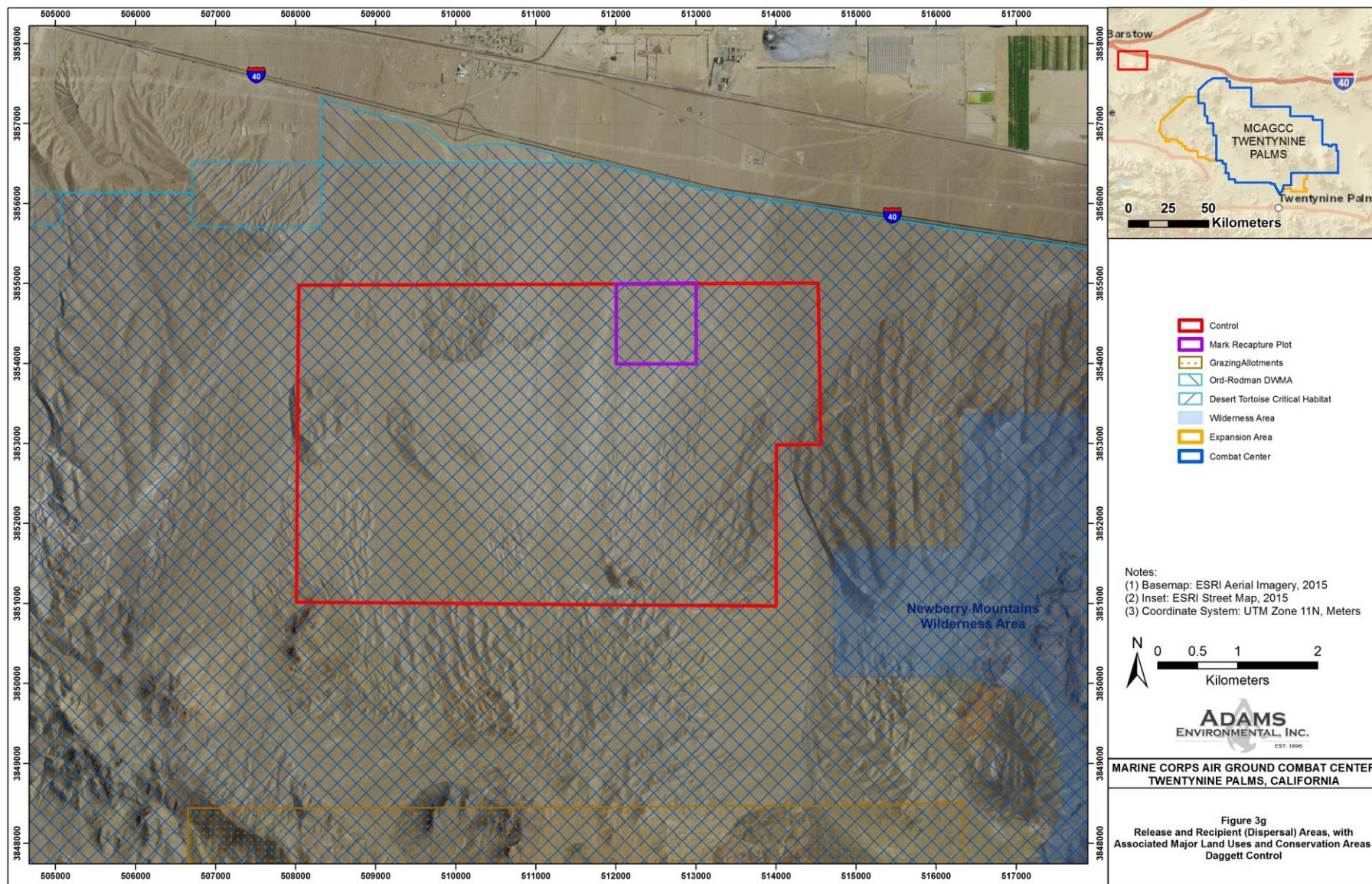












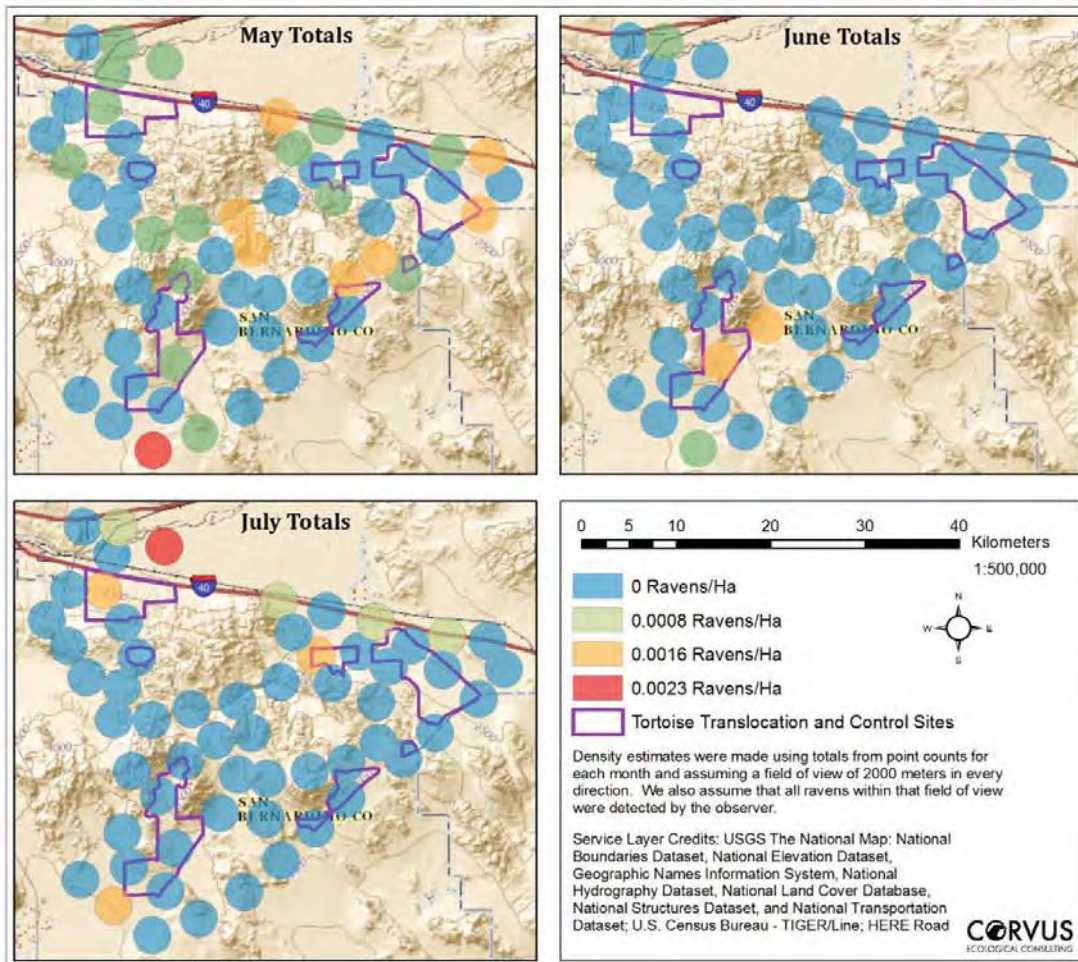
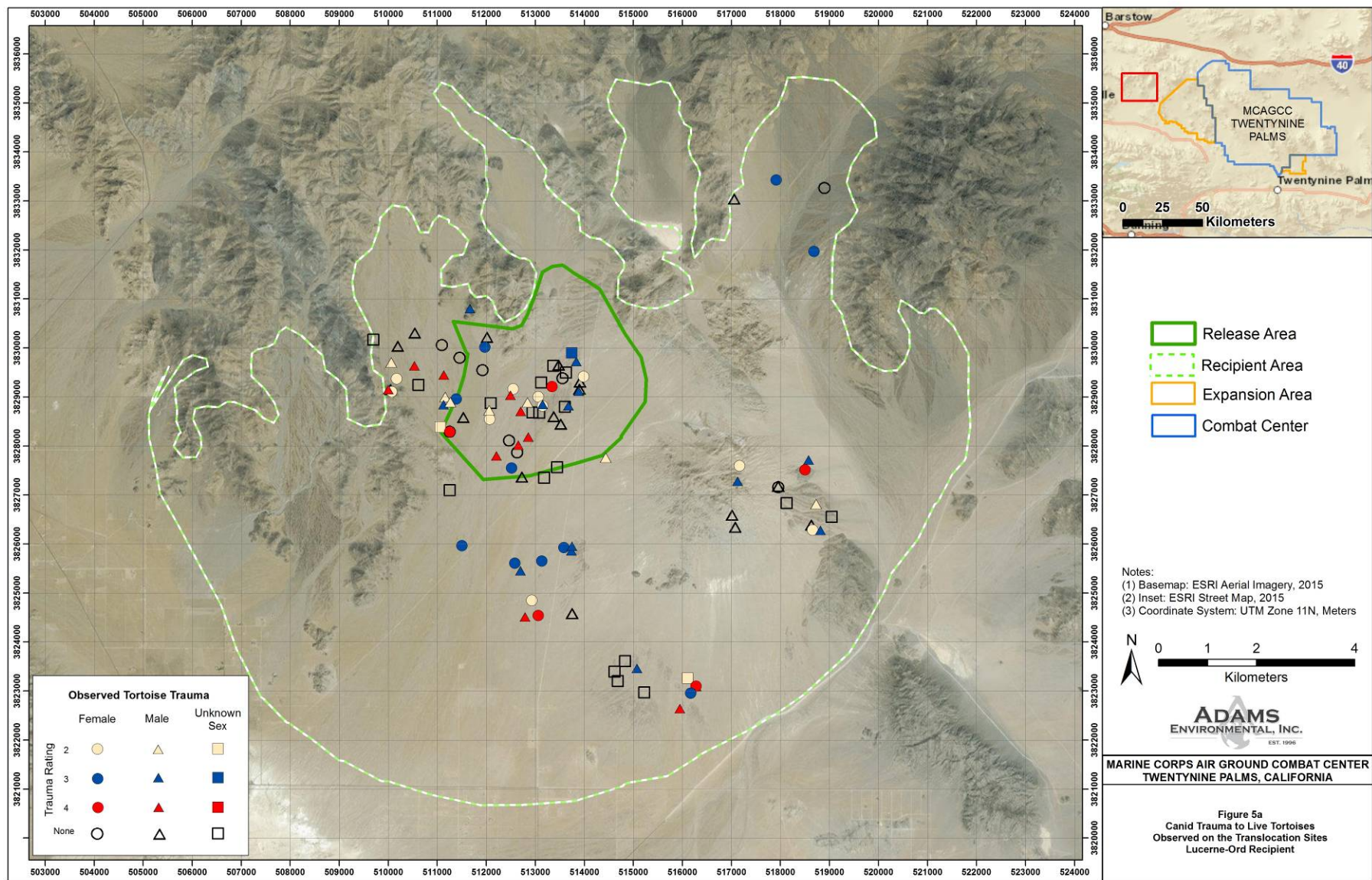
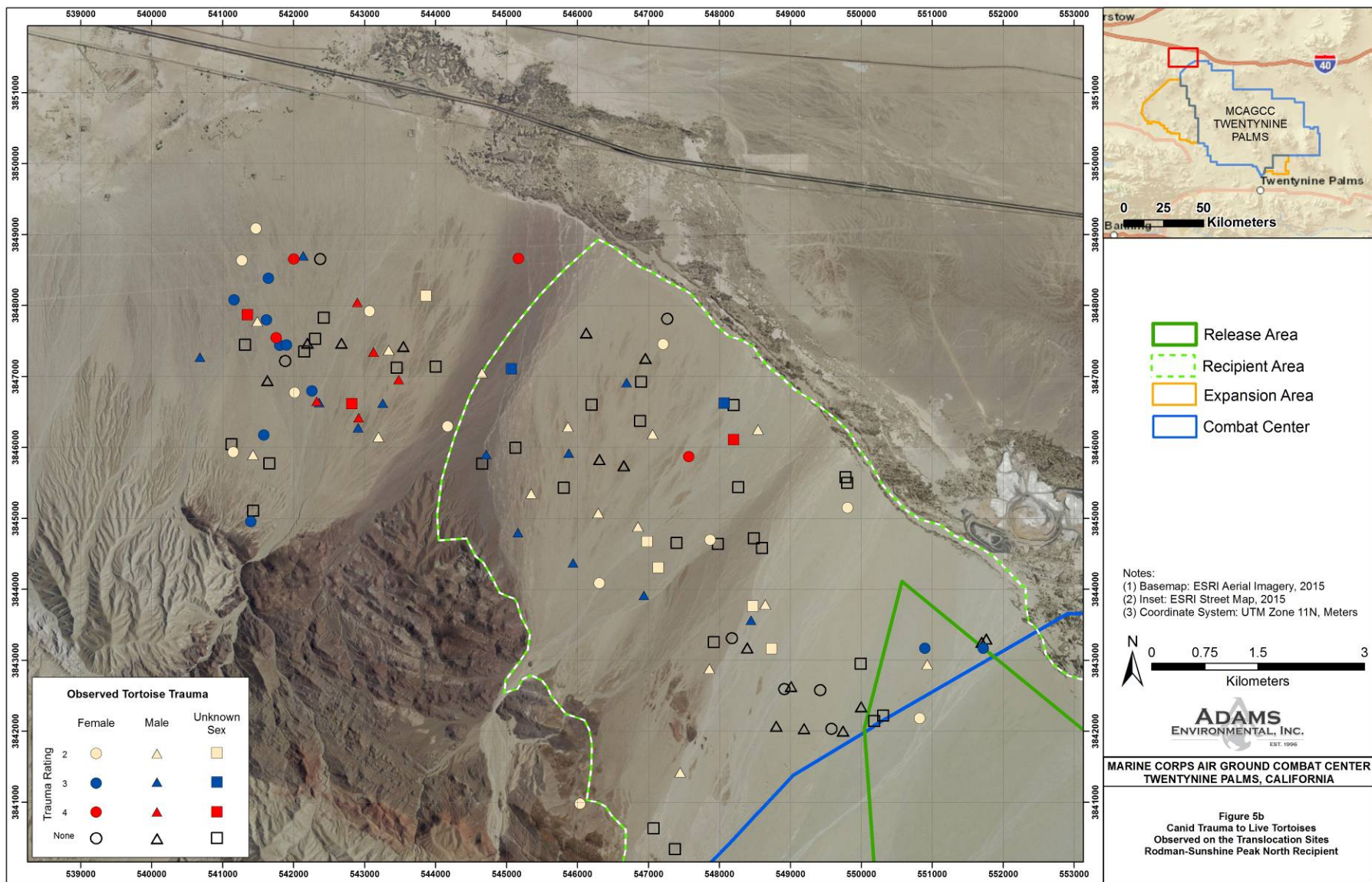
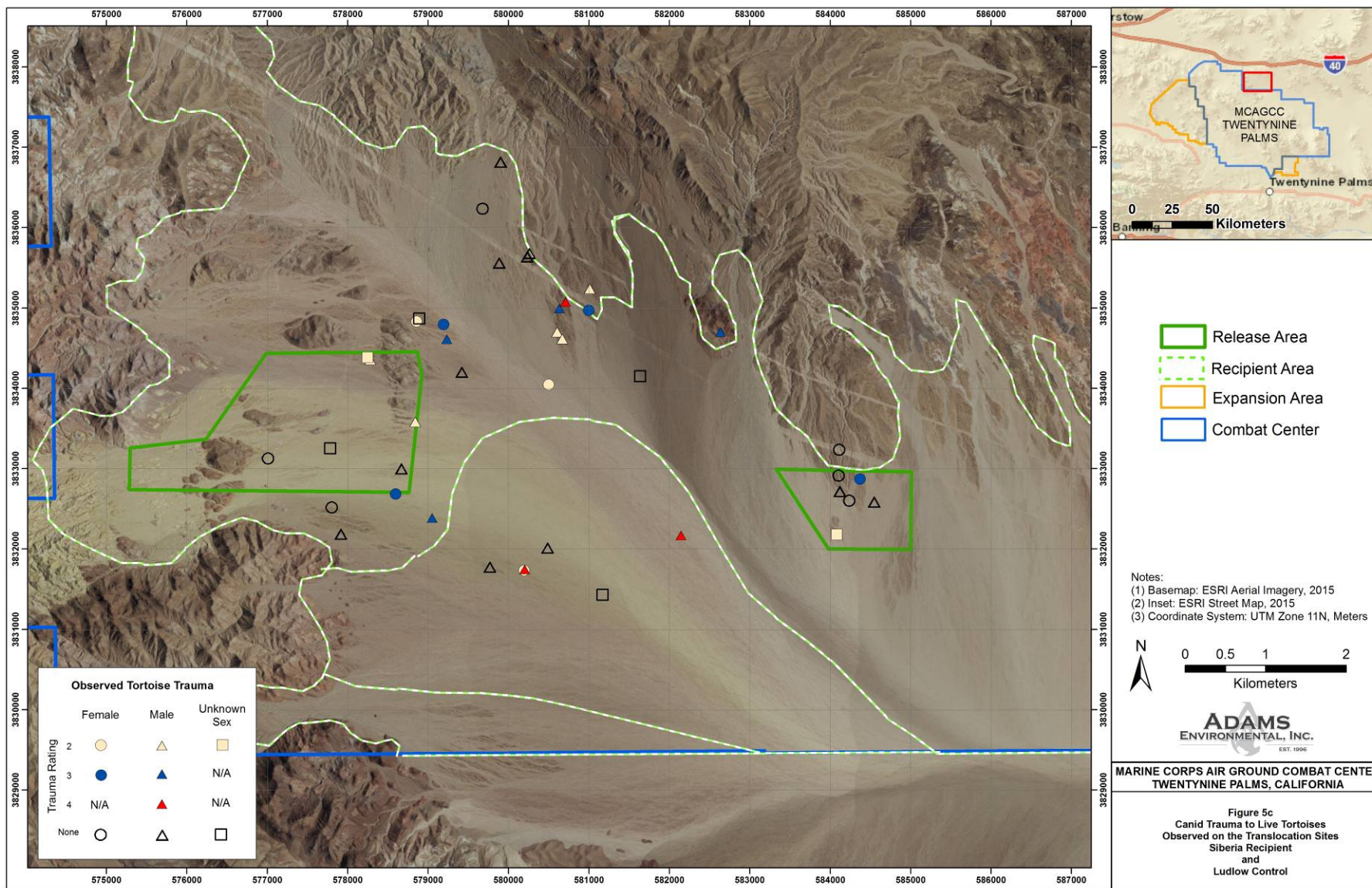
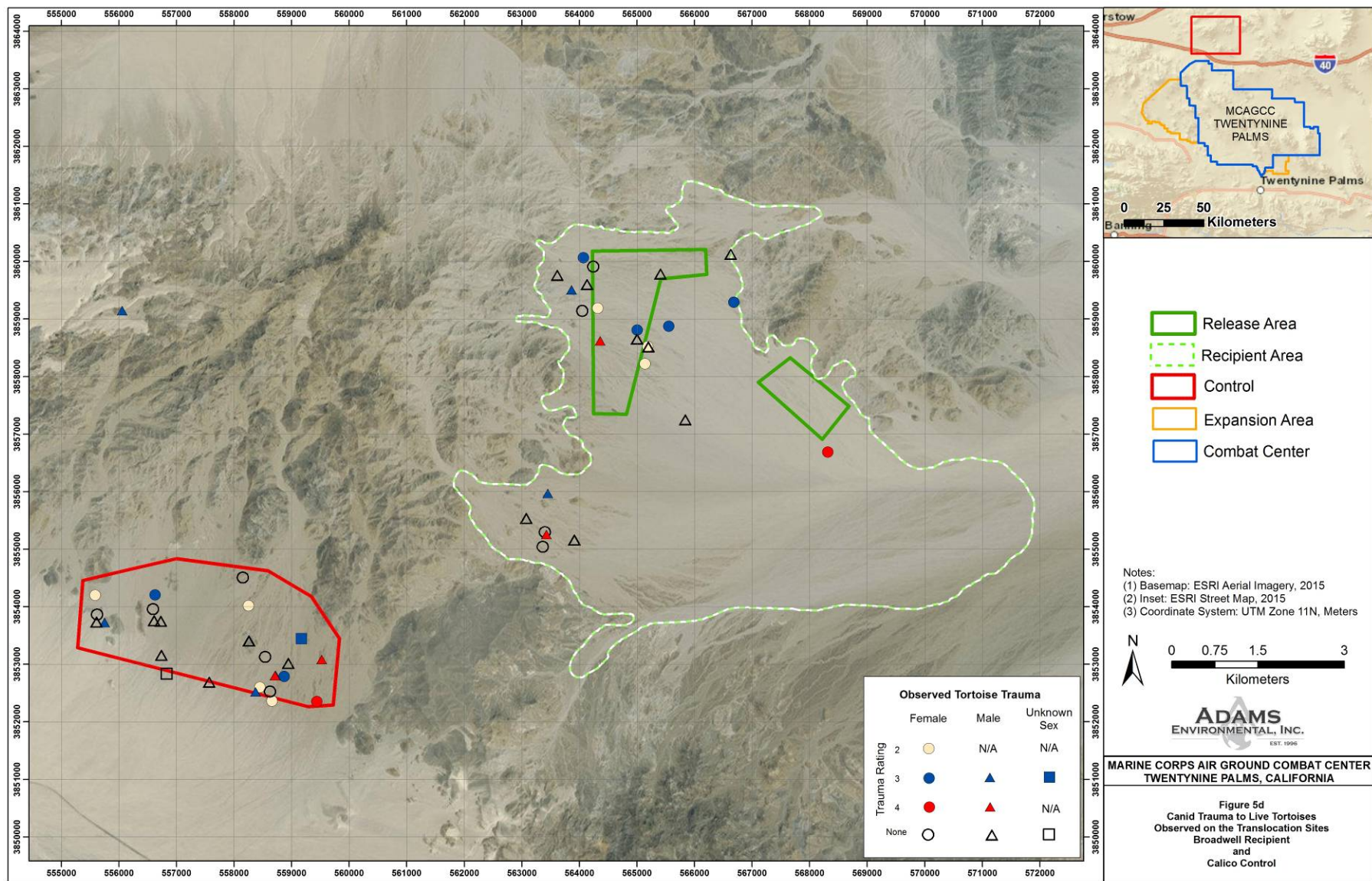


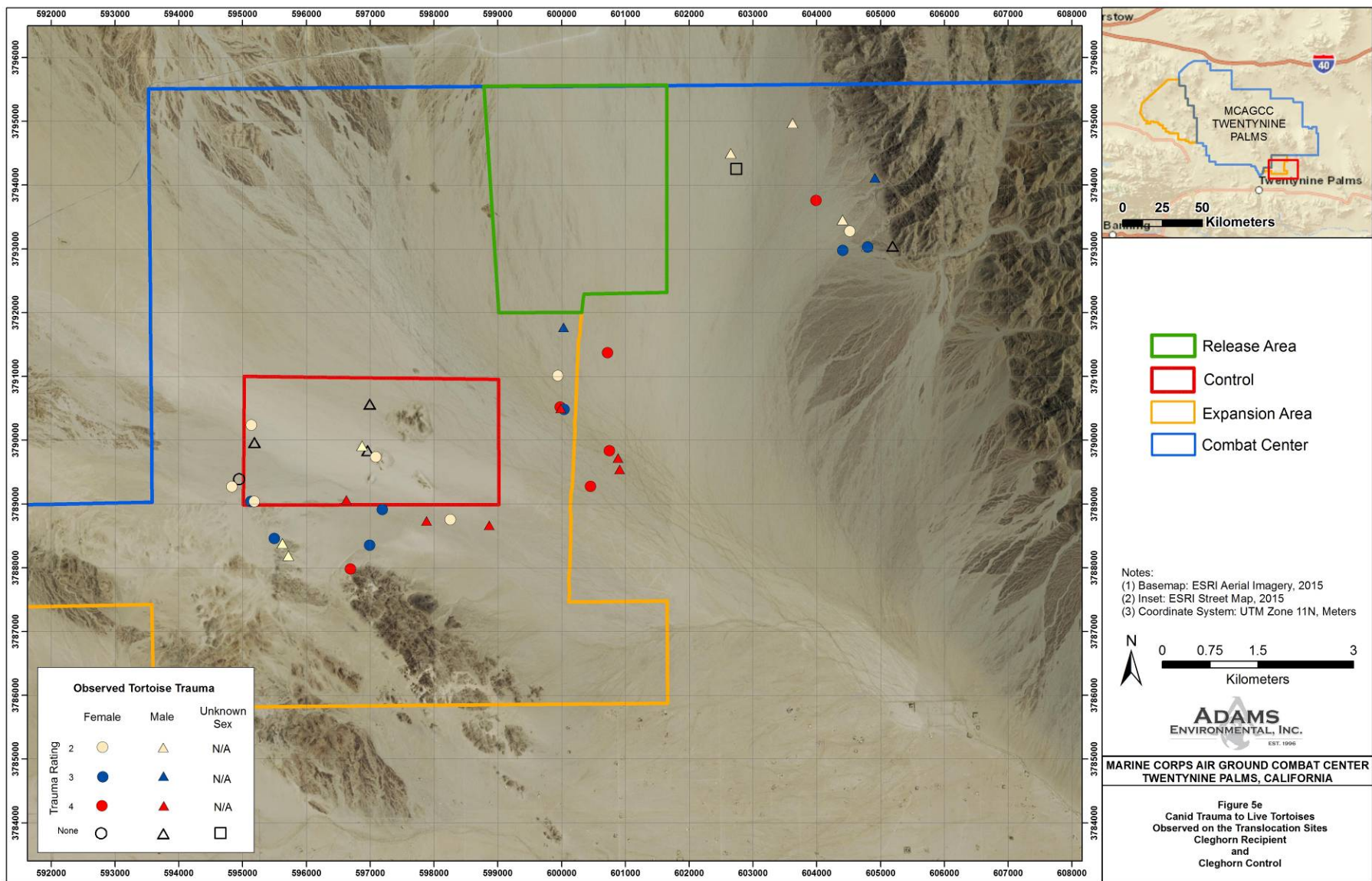
Figure 4. Comparative raven pressure at four translocation sites (purple polygons). Point count totals for three months in Spring and Summer 2015 are shown for Lucerne-Ord Recipient, Rodman-Sunshine Peak North Recipient, Rodman-Sunshine Peak South Control, and Daggett Control. See legend for calculation of raven pressure. Source: Corvus Ecological, unpub. data.

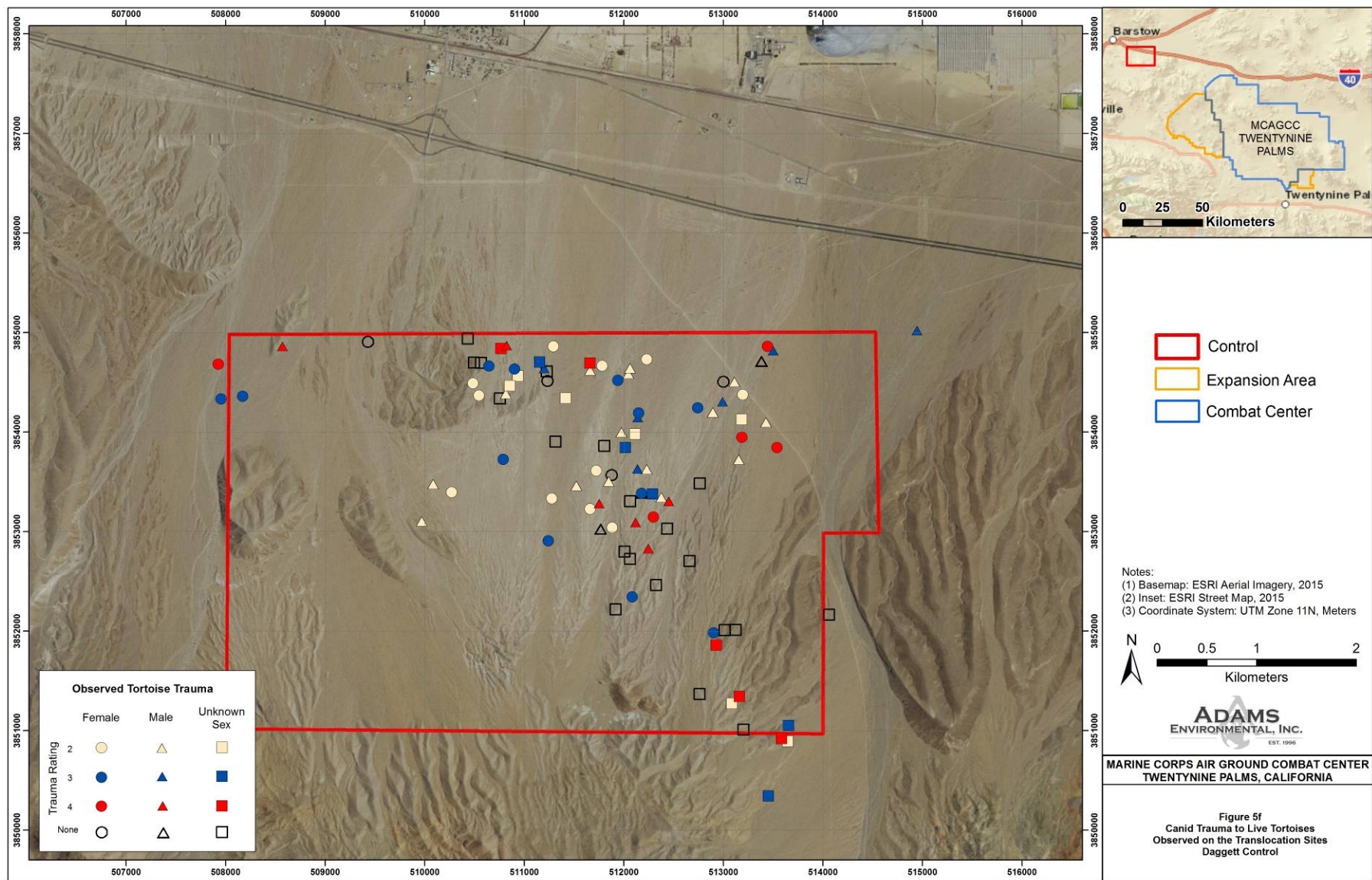


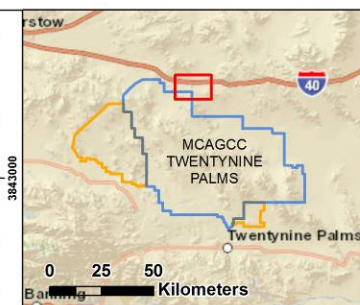
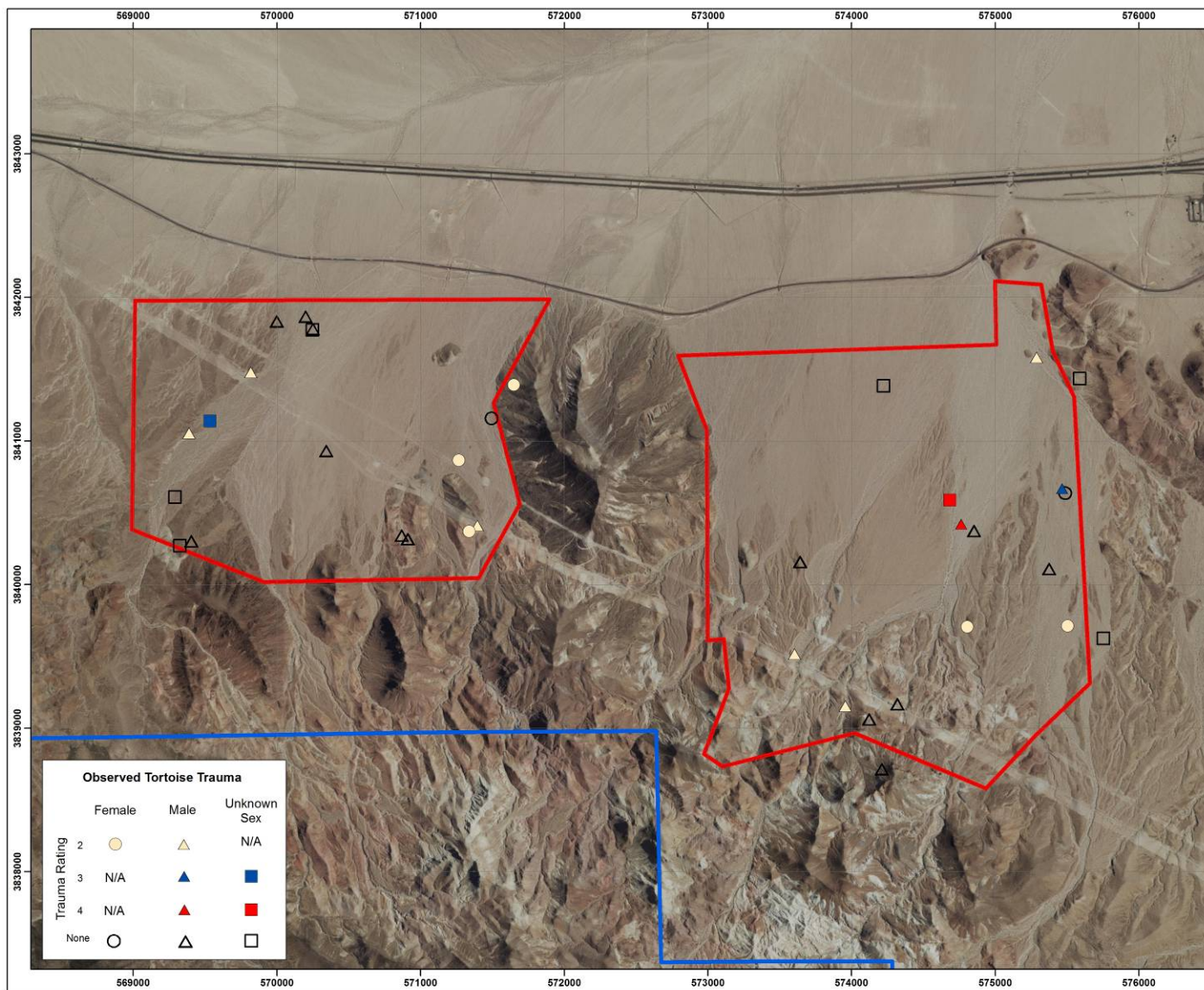






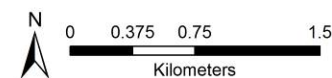






- Control
- Expansion Area
- Combat Center

Notes:
 (1) Basemap: ESRI Aerial Imagery, 2015
 (2) Inset: ESRI Street Map, 2015
 (3) Coordinate System: UTM Zone 11N, Meters



ADAMS
 ENVIRONMENTAL, INC.
 EST. 1996

**MARINE CORPS AIR GROUND COMBAT CENTER
 TWENTYNINE PALMS, CALIFORNIA**

Figure 5g
 Canid Trauma to Live Tortoises
 Observed on the Translocation Sites
 Ludlow Control

APPENDIX B

PUBLIC INVOLVEMENT

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burden per rule submission filing is estimated to be \$958.16. The Commission based its calculation on (1) an hourly wage rate of \$48.14 for a Compliance Specialist to perform the filing over 8 hours;¹ an hourly wage rate of \$71.63 for one economist to analyze trading data in the process over 8 hours.²

Respondents/Affected Entities: SEFs, DCMS.

Estimated Number of Respondents: 5.

Estimated Total Annual Burden on Respondents: 80 hours.

Frequency of Collection: Occasional.

Authority: 44 U.S.C. 3501 *et seq.*

Dated: August 19, 2016.

Christopher J. Kirkpatrick,
Secretary of the Commission.

[FR Doc. 2016-20288 Filed 8-23-16; 8:45 am]

BILLING CODE 6351-01-P

DEPARTMENT OF DEFENSE

Office of the Secretary

Defense Advisory Committee on Women in the Services; Notice of Federal Advisory Committee Meeting

AGENCY: Department of Defense.

ACTION: Federal Advisory Committee meeting notice.

SUMMARY: The Department of Defense is publishing this notice to announce that the following Federal Advisory Committee meeting of the Defense Advisory Committee on Women in the Services (DACOWITS) will take place. This meeting is open to the public.

DATES: Tuesday, September 13, 2016, from 8:30 a.m. to 2:15 p.m.; Wednesday, September 14, 2016, from 8:30 a.m. to 12 p.m.

ADDRESSES: Hilton Alexandria—Mark Center, 5000 Seminary Road, Alexandria, VA 22311.

FOR FURTHER INFORMATION CONTACT: Mr. Robert Bowling or DACOWITS Staff at 4800 Mark Center Drive, Suite 04J25-01,

Alexandria, Virginia 22350-9000; robert.d.bowling1.civ@mail.mil, telephone (703) 697-2122, fax (703) 614-6233. Any updates to the agenda or any additional information can be found at <http://dacowits.defense.gov/>.

SUPPLEMENTARY INFORMATION: Pursuant to the Federal Advisory Committee Act of 1972 (5 U.S.C. Appendix, as amended), the Government in the Sunshine Act of 1976 (5 U.S.C. 552b), and section 10(a), Public Law 92-463, as amended, notice is hereby given of a forthcoming meeting of the DACOWITS.

The purpose of the meeting is for the Committee to receive briefings and updates relating to their current work. The Committee will start the meeting with the Designated Federal Officer (DFO) giving a status update on the Committee's requests for information. There will then be a panel discussion with the U.S. Army and U.S. Marine Corps to discuss the Curriculum Standards for Infantry Officer School. This will be followed by a panel discussion with the Military Services on their Gender Neutral Occupational Standards. This will be followed with a public comment period. Day one will end with a panel discussion with the Military Services on their Maternity Uniforms. On the second day the Committee will receive a briefing from the Joint Advertising Market Research & Studies (JAMRS) Office on the Nation's Recruitable Population, which will then be followed by a panel discussion with the Military Services on the same topic. Lastly, the Committee will propose and vote on their 2016 Recommendations to the Secretary of Defense.

Pursuant to 41 CFR 102-3.140, and section 10(a)(3) of the Federal Advisory Committee Act of 1972, interested persons may submit a written statement for consideration by the DACOWITS.

Individuals submitting a written statement must submit their statement to the point of contact listed at the address in **FOR FURTHER INFORMATION CONTACT** no later than 5 p.m., Tuesday, September 6, 2016. If a written statement is not received by Tuesday, September 6, 2016, prior to the meeting, which is the subject of this notice, then it may not be provided to or considered by the DACOWITS until its next open meeting. The DFO will review all timely submissions with the DACOWITS Chair and ensure they are provided to the members of the Committee. If members of the public are interested in making an oral statement, a written statement should be submitted. After reviewing the written comments, the Chair and the DFO will determine who of the requesting persons will be able to make

an oral presentation of their issue during an open portion of this meeting or at a future meeting. Pursuant to 41 CFR 102-3.140(d), determination of who will be making an oral presentation is at the sole discretion of the Committee Chair and the DFO, and will depend on time available and if the topics are relevant to the Committee's activities. Five minutes will be allotted to persons desiring to make an oral presentation. Oral presentations by members of the public will be permitted only on Tuesday, September 13, 2016 from 12 p.m. to 12:30 p.m. in front of the full Committee. The number of oral presentations to be made will depend on the number of requests received from members of the public.

Pursuant to 5 U.S.C. 552b and 41 CFR 102-3.140 through 102-3.165, this meeting is open to the public, subject to the availability of space.

Meeting Agenda

Tuesday, September 13, 2016, From 8:30 a.m. to 2:15 p.m.

- Welcome, Introductions, Announcements
- Request for Information Status Update
- Panel Discussion—Curriculum Standards for Infantry Officer School
- Panel Discussion—Gender Neutral Occupational Standards
- Public Comment Period
- Panel Discussion—Maternity Uniforms

Wednesday, September 14, 2016, From 8:30 a.m. to 12:00 p.m.

- Welcome and Announcements
- Briefing—The Nation's Recruitable Population
- Panel Discussion—The Nation's Recruitable Population
- Committee Proposes and Votes on 2016 Recommendations

Dated: August 19, 2016.

Aaron Siegel,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2016-20306 Filed 8-23-16; 8:45 am]

BILLING CODE 5001-06-P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare a Supplemental Environmental Impact Statement (EIS) to the Land Acquisition and Airspace Establishment Final EIS at the Marine Corps Air Ground Combat Center, Twentynine Palms, California

AGENCY: Department of the Navy, DoD.

¹ See Report on Management & Professional Earnings in the Securities Industry 2013, Securities Industry and Financial Markets Association at 4 (Oct. 2013). The report lists the average total annual compensation for a compliance specialist (intermediate) as \$66,649. The Commission estimated the personnel's hourly cost by assuming an 1,800 hour work year and by multiplying by 1.3 to account for overhead and other benefits.

² See Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, Economists, <http://www.bls.gov/ooh/life-physical-and-social-science/economists.htm>. The report lists the median total annual compensation for an economist as \$99,180. The Commission estimated the economist personnel's hourly cost by assuming an 1,800 hour work year and by multiplying by 1.3 to account for overhead and other benefits.

ACTION: Notice.

SUMMARY: Pursuant to Section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969, as implemented by the Council on Environmental Quality Regulations (40 CFR parts 1500–1508), the Department of the Navy (DON) announces its intent to prepare a Supplemental Environmental Impact Statement (EIS) to evaluate the potential environmental impacts that may result from implementing alternative desert tortoise translocation plans at the Marine Corps Air Ground Combat Center, Twentynine Palms (hereinafter “the Combat Center”). The Supplemental EIS is a supplement to the Final EIS for “Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live Fire and Maneuver Training” dated July 2012 (hereinafter “2012 Final EIS”) (77 FR 44234).

SUPPLEMENTARY INFORMATION: Pursuant to 40 CFR 1502.9(c), a Supplemental EIS is being prepared to evaluate new information relevant to environmental concerns associated with translocation of tortoises from specific training areas on newly acquired lands. Translocation was deemed necessary to mitigate the moderate to high levels of impact on the tortoise population from the Marine Expeditionary Brigade training activities assessed in the 2012 Final EIS. Since the 2012 Final EIS, the Marine Corps has conducted additional detailed studies and worked cooperatively with the United States Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife, and the Bureau of Land Management (BLM) on alternative translocation plans for the desert tortoise, as required in a 2012 Biological Opinion (BO) issued by the USFWS. In light of new information gained from these efforts, the DON has elected to prepare a Supplemental EIS focusing on the evaluation of potential impacts from alternative tortoise translocation plans.

The purpose of the proposed action evaluated in the Supplemental EIS is to study alternative translocation plans in support of the project that was described in the 2012 Final EIS, selected in the 2013 Record of Decision (ROD) (78 FR 11632), and authorized by the National Defense Authorization Act for Fiscal Year 2014.

The Marine Corps needs to implement the proposed action to satisfy requirements identified in the 2012 Final EIS and associated 2012 BO. The 2012 BO concluded that the implementation of the Preferred Alternative from the 2012 Final EIS would likely result in the “take” of desert tortoises associated with military

training, tortoise translocation efforts, and authorized and unauthorized Off-Highway Vehicle (OHV) use by recreationists displaced from former areas of the Johnson Valley OHV Area.

The 2013 ROD and associated BO committed the Marine Corps to undertake measures to minimize the “take” of desert tortoises including:

- Establishment of new Special Use Areas (tortoises habitat areas where military training and Off-Highway Vehicle use will be prohibited;
- Translocation Program;
- Desert Tortoise Headstarting and Population Augmentation; and
- Monitoring.

While the 2012 Final EIS and associated BO analyzed a particular translocation program, additional detailed studies and cooperative work on alternative translocation plans for the desert tortoise revealed other possible methods of meeting these requirements. In light of the purpose and need for the proposed action, the DON has identified two potential action alternatives and a No-Action Alternative for the translocation of desert tortoise from training impact areas.

Each alternative will identify recipient sites (to which tortoises would be translocated), and control sites (where the resident tortoise populations will be studied to provide comparative data on survival, threats to survival, habitat stability and changes, and health and disease relative to the translocated tortoise populations at the recipient sites). Each alternative will also include details of the proposed tortoise translocation, including specific handling procedures, fencing, clearance surveys, 30 years of post-translocation monitoring, and other research activities.

The Combat Center identified and applied screening criteria from the 2011 USFWS revised recovery plan for the Mojave population of the desert tortoise and the 2011 USFWS guidance for translocation of desert tortoises to evaluate and select the proposed recipient sites/areas under each alternative. These criteria relate to land use, habitat quality, population levels, disease prevalence, and distance from collection. The Combat Center also screened for research and monitoring feasibility.

Under the No-Action Alternative, the Marine Corps would conduct translocation of desert tortoises in accordance with the General Translocation Plan (GTP) described in the 2012 BO. Alternatives 1 and 2 primarily differ from the No Action Alternative in the selection of proposed recipient and control areas and in the

distribution of desert tortoises at each release site. Compared to the No Action Alternative, Alternatives 1 and 2 would also include additional research studies and reflect updated information obtained from the 3-year program of surveys conducted since the 2012 Final EIS. Alternative 2 differs from Alternative 1 in that: (1) One less recipient site would be used; (2) the pairing of control sites to recipient sites would be different; (3) the Bullion control site would be located on the Combat Center instead of within the Cleghorn Lakes Wilderness Area; and (4) translocation densities would be different.

The Supplemental EIS will analyze environmental effects associated primarily with biological resources, land use, air quality, and cultural resources. The Supplemental EIS analysis will evaluate direct, indirect, short-term and long-term impacts, as well as cumulative impacts from other relevant activities. Additionally, the DON will undertake any consultations required by all applicable laws or regulations.

BLM has been invited to be a Cooperating Agency on the preparation of the Supplemental EIS since many of the lands to which tortoises would be relocated are managed by BLM.

Pursuant to 40 CFR 1502.9(c)(4), the DON will prepare, circulate, and file the Supplemental EIS in the same fashion (exclusive of scoping) as it did the draft and 2012 Final EIS. This will include providing a Draft Supplemental EIS for a 45-day public review period in October 2016, during which three (3) public information meetings will be held in the communities of Joshua Tree, Palm Springs, and Barstow. A Notice of Availability of the Draft Supplemental EIS and Notice of Public Meetings will be published in the **Federal Register**, in area newspapers, and on the Supplemental EIS Web site at <http://LADTT.com> in advance of the release of the Draft Supplemental EIS and the public meetings. Those notices will identify further details about the public meetings and the specific opportunities and methods for the public to provide comments on the Draft Supplemental EIS.

The mailing list for the Supplemental EIS is based on the 2012 Final EIS. Those on this list will receive notices and documents related to Supplemental EIS preparation. This list includes local, state, and federal agencies with jurisdiction or other interests in the alternatives. In addition, the mailing list includes adjacent property owners, affected municipalities, and other interested parties such as conservation

and off-highway vehicle organizations. Anyone wishing to be added to the mailing list may request to be added by contacting the Supplemental EIS project manager at the address below.

No decision will be made to implement any alternative until the Supplemental EIS process is completed and a ROD is signed by the Assistant Secretary of the Navy (Energy, Installations and Environment) or designee.

FOR FURTHER INFORMATION CONTACT:

NEPA Program Manager (Attn: Mr. Scott Kerr), Bldg. 1418, MAGTFTC/MCAGCC, Twentynine Palms, CA 92278–8104; phone: 760–830–8190; email: Scott.Kerr@usmc.mil.

Dated: August 18, 2016.

C. Pan,

Lieutenant, Judge Advocate General's Corps, U.S. Navy, Alternate Federal Register Liaison Officer.

[FR Doc. 2016–20231 Filed 8–23–16; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

[Docket No.: ED–2016–ICCD–0093]

Agency Information Collection Activities; Comment Request; 2012/17 Beginning Postsecondary Students Longitudinal Study: (BPS:12/17)

AGENCY: National Center for Education Statistics (NCES), Department of Education (ED).

ACTION: Notice.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. chapter 3501 *et seq.*), ED is proposing a revision of an existing information collection.

DATES: Interested persons are invited to submit comments on or before October 24, 2016.

ADDRESSES: To access and review all the documents related to the information collection listed in this notice, please use <http://www.regulations.gov> by searching the Docket ID number ED–2016–ICCD–0093. Comments submitted in response to this notice should be submitted electronically through the Federal eRulemaking Portal at <http://www.regulations.gov> by selecting the Docket ID number or via postal mail, commercial delivery, or hand delivery. *Please note that comments submitted by fax or email and those submitted after the comment period will not be accepted.* Written requests for information or comments submitted by postal mail or delivery should be addressed to the Director of the

Information Collection Clearance Division, U.S. Department of Education, 400 Maryland Avenue SW., LBJ, Room 2E–349, Washington, DC 20202–4537.

FOR FURTHER INFORMATION CONTACT: For specific questions related to collection activities, please contact NCES Information Collections at NCES.Information.Collections@ed.gov.

SUPPLEMENTARY INFORMATION: The Department of Education (ED), in accordance with the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3506(c)(2)(A)), provides the general public and Federal agencies with an opportunity to comment on proposed, revised, and continuing collections of information. This helps the Department assess the impact of its information collection requirements and minimize the public's reporting burden. It also helps the public understand the Department's information collection requirements and provide the requested data in the desired format. ED is soliciting comments on the proposed information collection request (ICR) that is described below. The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology. Please note that written comments received in response to this notice will be considered public records.

Title of Collection: 2012/17 Beginning Postsecondary Students Longitudinal Study: (BPS:12/17).

OMB Control Number: 1850–0631.

Type of Review: A revision of an existing information collection.

Respondents/Affected Public: Individuals.

Total Estimated Number of Annual Responses: 39,399.

Total Estimated Number of Annual Burden Hours: 55,002.

Abstract: The 2012/17 Beginning Postsecondary Students Longitudinal Study (BPS:12/17) is conducted by the National Center for Education Statistics (NCES), within the U.S. Department of Education (ED). BPS is designed to follow a cohort of students who enroll in postsecondary education for the first time during the same academic year, irrespective of the date of high school completion. The study collects data on

students' persistence in and completion of postsecondary education programs; their transition to employment; demographic characteristics; and changes over time in their goals, marital status, income, and debt, among other indicators. Data from BPS are used to help researchers and policymakers better understand how financial aid influences persistence and completion, what percentages of students complete various degree programs, what are the early employment and wage outcomes for certificate and degree attainers, and why students leave school. This request is to conduct the BPS:12/17 full-scale data collection, including a student interview, file matching to various administrative data sources, and collection of corresponding postsecondary education transcripts and student records.

Dated: August 19, 2016.

Tomakie Washington,

Acting Director, Information Collection Clearance Division, Office of the Chief Privacy Officer, Office of Management.

[FR Doc. 2016–20263 Filed 8–23–16; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF EDUCATION

Reopening the Fiscal Year 2016 Competition for Certain Eligible Applicants; Investing in Innovation Fund—Development Grants Full Application

[Catalog of Federal Domestic Assistance (CFDA) Number: 84.411C]

AGENCY: Office of Innovation and Improvement, Department of Education.

ACTION: Notice.

SUMMARY: On April 25, 2016, we published in the **Federal Register** (81 FR 24070) a notice inviting applications for new awards for fiscal year (FY) 2016 for the Investing in Innovation (i3) Fund Development competition. The Department reopens the FY 2016 i3 Development Grants competition for, and will accept applications from, certain prospective eligible applicants affected by the severe storms and flooding beginning on August 11, 2016, and continuing, in Louisiana. We are reopening this competition in order to help affected eligible applicants compete fairly with other eligible applicants under this competition.

DATES:

Deadline for Transmittal of Applications for Eligible Applicants: August 30, 2016.

Deadline for Intergovernmental Review: October 24, 2016.



UNITED STATES MARINE CORPS
MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
BOX 788100
TWENTYNINE PALMS, CALIFORNIA 92278-8100

5060
4
23 Aug 16

Dear Sir/Madam:

Subj: SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR PROPOSED DESERT
TORTOISE TRANSLOCATION OPTIONS AT MARINE CORPS AIR GROUND COMBAT
CENTER TWENTYNINE PALMS, CALIFORNIA

The Department of the Navy is in the initial stages of preparing a Supplemental Environmental Impact Statement (EIS) to evaluate the potential environmental effects of alternative desert tortoise translocation options at Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms, CA. Translocation of the desert tortoise is necessary to support training on newly-acquired training areas resulting from a 2013 Record of Decision for Land Acquisition/Airspace Establishment at MCAGCC.

A Draft Supplemental EIS is scheduled for public release in October 2016 and will be available for a 45-day public review, during which public information meetings will be held in the communities of Joshua Tree, Palm Springs, and Barstow.

A Notice of Availability of the Draft Supplemental EIS and more details about the public meetings will be provided before release of the draft document. Announcements will identify specific opportunities for you to provide your comments on the Draft Supplemental EIS.

For more information, please visit the project website at <http://www.SEISforLAA.com> or call the Resource Management Group at (760) 830-3737.

Sincerely,

A handwritten signature in black ink, appearing to read "J. D. Wylie", is positioned above the typed name.

J. D. WYLIE
Assistant Chief of Staff, G-4
By Direction

APPENDIX C
AGENCY CORRESPONDENCE

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UNITED STATES MARINE CORPS
MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
BOX 788110
TWENTYNINE PALMS, CALIFORNIA 92278-8110

5750
4E/c-16-0201
January 25, 2016

Ms. Julianne Polanco
State Historic Preservation Officer
Office of Historic Preservation
Department of Parks and Recreation
1725 23rd St. #100
Sacramento, CA 95816

SUBJECT: SIGNAGE AND FENCING FOR LANDEX TORTOISE TRANSLOCATION ABOARD
THE MARINE CORPS AIR GROUND COMBAT CENTER, TWENTYNINE PALMS,
SAN BERNARDINO COUNTY, CALIFORNIA

The Marine Corps is providing for your review and concurrence, information regarding the proposed undertaking to install signs and tortoise exclusion fencing within multiple Training Areas (TAs) aboard the Marine Corps Air Ground Combat Center (Combat Center), Twentynine Palms, California.

The project consists of emplacing standard tortoise exclusion fencing and/or three-strand twisted wire fence at locations depicted in Enclosure 1, Maps 1-6 and Table 1. A permanent maintenance road five meters wide will be constructed along the fence line where terrain permits. Trenches required for emplacement of tortoise exclusion fencing will be excavated 4-6 inches (10.2 - 15.4 cm) wide by 12 inches (30.7cm) deep. Temporary laydown areas will be placed within five meters of the maintenance road.

The Marine Corps has determined the Area of Potential Effect (APE) as a 100-meter wide strip along the proposed fence line (50 meters on each side) to take into account terrain considerations when placing the signs and trenching for the fence.

Some portions of the APE have been surveyed (see Enclosure 1: Maps 1-6; Table 2). These reports are among those provided to all consulting tribal groups as well as the California State Historic Preservation Office. One archaeological site (CA-SBR-12950) has been identified within the APE. The site, a Saratoga Springs period complex occupation, was evaluated in 2013 by Far Western Anthropological Research Group, Inc. (CRR214) and was recommended as eligible for National Register Listing under Criterion D. Intact cultural deposits appear to be artifact rich and contain at least one dateable feature. The site will be avoided and will be monitored by a Natural Resources Environmental Affairs (NREA)-approved archaeologist.

The Marine Corps has applied the criteria of adverse effect (36 CFR §800.5(a)) and has determined that this undertaking will not

5750
4E/c-16-0201
January 25, 2016

adversely affect (alter, directly or indirectly) any characteristics of a historic property that qualify it for inclusion in the National Register of Historic Places or in a manner that would diminish the property's integrity for the following reason:

a. The Marine Corps will provide for an archaeological monitor to be present for all sign and post emplacement as well as all trenching for tortoise exclusion fencing. The monitor will ensure that no signs, posts, or trenches will be placed in a manner that would disturb any archaeological feature.

b. Any new archaeological site will be recorded at the primary record level, its location entered into the Combat Center's Geographic Information System database, and the site reported to the cultural resources staff. The monitor will ensure that no signs, posts, or trenches will be placed in a manner that would disturb any archaeological feature.

c. Laydown areas will be restricted to the defined APE and placement will be monitored by the archaeological monitor to ensure no cultural resources are present.

Full project packets, including project description, are being provided to the following tribes this date: Agua Caliente Band of Cahuilla Indians, Chemehuevi Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Morongo Band of Mission Indians, San Manuel Band of Mission Indians, and the Twentynine Palms Band of Mission Indians. According to the Native American Heritage Commission and past consultation with the aforementioned tribes, there are no sacred sites in the proposed project area.

The enclosed documentation satisfies requirements set forth in CFR 800.11(d). After consideration, the Marine Corps has reached a finding of "no historic properties adversely affected." The Marine Corps requests concurrence with this finding. The Marine Corps also requests the State Historic Preservation Officer concur with our determination of CA-SBR-12950 as eligible for listing in the National Register of Historic Places.

5750
4E/c-16-0201
January 25, 2016

Please feel free to contact the Combat Center Cultural Resources Manager, Ms. Leslie Glover, at 760-830-5369 (leslie.glover@usmc.mil), or Dr. John Hale at 760-830-7641 (john.p.hale@usmc.mil), with any questions or concerns.

Sincerely,

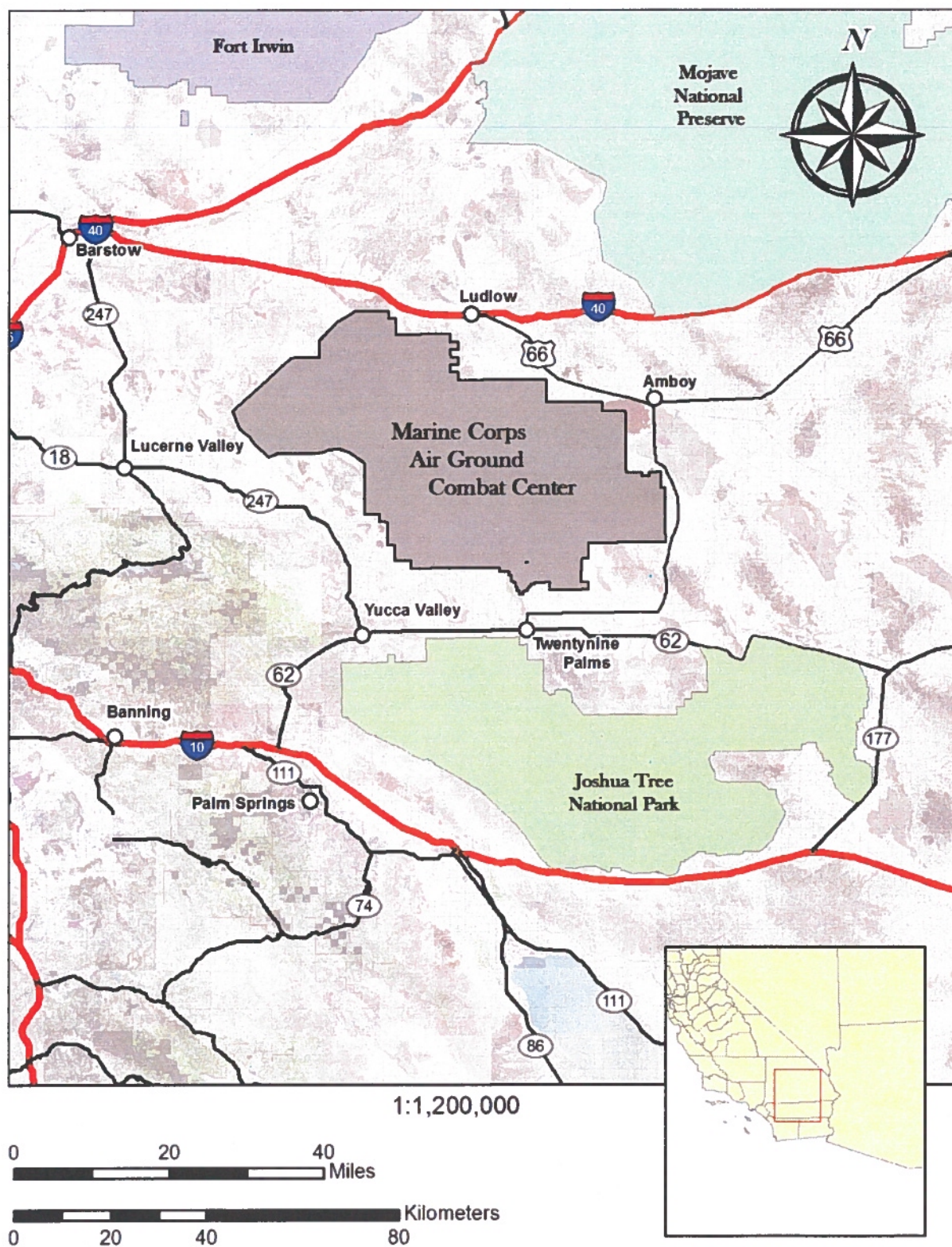


R. W. LUZZIER
Deputy Director, NREA

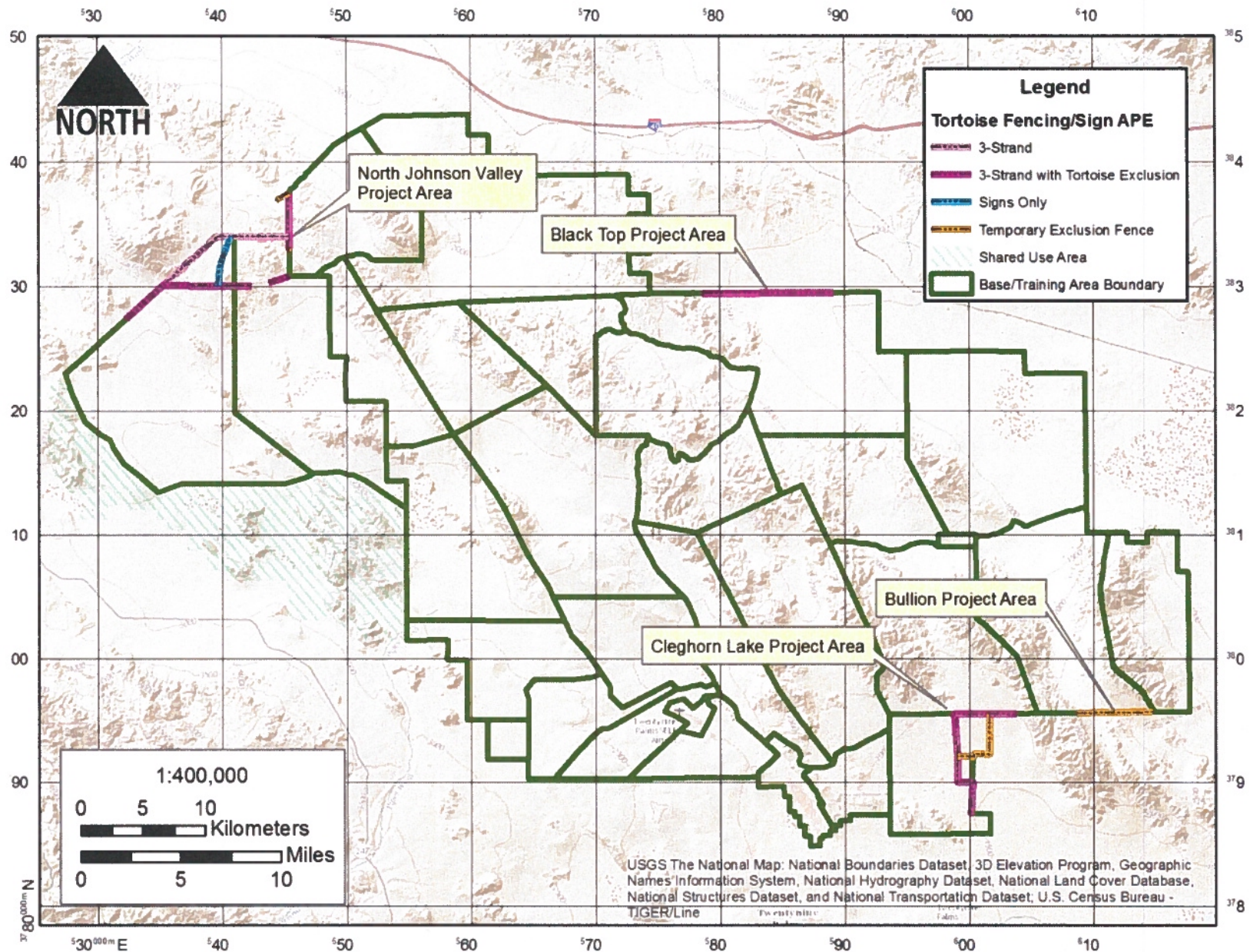
Enclosures: 1. Project Maps
2. Project Table

Copy to: AC/S G-4
NREA Files/Conservation
Mr. Ed Carroll, CA SHPO
Agua Caliente Band of Cahuilla Indians
Chemehuevi Indian Tribe
Colorado River Indian Tribes
Fort Mojave Indian Tribe
Morongo Band of Mission Indians
San Manuel Band of Serrano Mission Indians
Twentynine Palms Band of Mission Indians

Map 1. Installation Location



Map 2. Project Overview



**OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION**

1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov



February 16, 2016

Reply in Reference To: USMC_2016_0126_001

Mr. R. W. Luzier, Deputy Director
Natural Resources and Environmental Affairs Division
Marine Corps Air Ground Combat Center
United States Marine Corps
Box 788110
Twentynine Palms, California 92278-8110

Re: Signage and Fencing for Landex Tortoise Translocation Aboard the Marine Corps Air Ground Combat Center, Twentynine Palms, San Bernardino County, California (your letter 5750, 4E/c-16-0201 of January 25, 2016 and two supplemental e-mails of February 3, 2016))

Dear Mr. Luzier:

Thank you for initiating consultation regarding the United States Marine Corps' efforts to comply with Section 106 of the *National Historic Preservation Act of 1966* (54 U.S.C. § 306108), as amended, and its implementing regulation found at 36 CFR Part 800. Marine Corps Air Ground Combat Center (MCAGCC) Twentynine Palms proposes to construct or install one of the following actions at four different training areas: (1) construction of standard tortoise exclusion fencing, (2) construction of three-strand twisted wire fencing, (3) construction of temporary exclusion fencing, or (4) installation of signs only.

The proposed undertaking will consist of the following components:

- Construction of the standard tortoise exclusion fencing will require the excavation of trenches measuring 4 to 6 inches wide and 12 inches deep;
- Construction of the three-strand twisted wire fencing will use t-posts and then the wire will be strung between the posts;
- The temporary exclusion fencing will be similar to the three-strand twisted wire fencing;
- The signs will be mounted on posts; and
- The active working areas and temporary laydown areas will be located within five meters of the fencing or signs.

The area of potential effects (APE) is 44.6 miles long collectively and the lengths of the individual components are as follows: (standard tortoise exclusion fencing – 30.2 miles, three-strand twisted wire fencing – 7.2 miles, temporary exclusive fencing – 4.6 miles, and signs only – 2.6 miles). Access to the APE will be by existing roads.

A records review was conducted at the Cultural Resources Section of the Natural Resources and Environmental Affairs (NREA) Division at MCAGCC, which identified that the APE had been previously surveyed by NREA's personnel or contractors. Those nine surveys identified only one archaeological site (CA-SBR-12950) as being located in the APE. That site was evaluated by Far Western Anthropological Research Group in 2013, who concluded that it was a Saratoga Springs period complex occupation site and that it was eligible for listing on the National Register of Historic Places under Criterion D.

MCAGCC has determined that the proposed undertaking will proceed under the following conditions:

- CA-SBR-12950 will be flagged and it will be monitored by a NREA-approved archaeologist to ensure that it is not inadvertently disturbed or affected;
- Archaeological monitors will be present during all sign and post emplacements as well as the trenching to ensure that no cultural resources are disturbed;
- Any new archaeological sites will be recorded and entered into the both NREA's and the State's databases; and
- Laydown areas will be restricted to the defined APE and placement will be monitored by archaeological monitors to ensure that no cultural resources are disturbed.

MCAGCC consulted with 7 tribal governments or groups and the Native American Heritage Commission (NAHC) in regards to the proposed undertaking. No sacred sites were identified by NAHC and none of the tribes had any comments in regards to the proposed undertaking.

Based on the records review, the pedestrian surveys, and the tribal consultations, MCAGCC has concluded that a finding of No Adverse Effect is appropriate for this proposed undertaking. MCAGCC has requested me to concur with their identification of the APE and their finding of No Adverse Effect.

After reviewing your letter of January 25, 2016 and the supplemental e-mails, I have the following comments:

- (1) I have no objections to your identification and delineation of the APE, pursuant to 36 CFR Parts 800.4(a)(1) and 800.16(d);
- (2) I concur with your decision to conduct the proposed undertaking in accordance with the four conditions described above; and
- (3) I do not object to your finding of No Adverse Effect for this proposed undertaking.

Be advised that under certain circumstances, such as an unanticipated discovery or a change in project description, you may have additional future responsibilities for this proposed undertaking under 36 CFR Part 800. Should you encounter cultural artifacts during ground disturbing activities, please halt all work until a qualified archaeologist can be consulted on the nature and significance of such artifacts.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions or concerns, please contact either of the following members of my staff: Ed Carroll at (916) 445-7006 or at e-mail at Ed.Carroll@parks.ca.gov or Duane Marti at (916) 445-7030 or at email at Duane.Marti@parks.ca.gov.

Sincerely,



Julianne Polanco
State Historic Preservation Officer



UNITED STATES MARINE CORPS
MARINE AIR GROUND TASK FORCE TRAINING COMMAND
MARINE CORPS AIR GROUND COMBAT CENTER
BOX 788100
TWENTYNINE PALMS, CALIFORNIA 92278-8100

5090

4E

AUG 12 2016

Tom Zale, Acting District Manager
California Desert District
Bureau of Land Management
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553

Dear Mr. Zale:

SUBJECT: COOPERATING AGENCY REQUEST

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy (DON) intends to prepare a Supplemental Environmental Impact Statement (SEIS) to assess the potential environmental consequences of proposed revisions to the Desert Tortoise Translocation program in and around the Marine Corps Air Ground Combat Center, Twentynine Palms, California (hereinafter referred to as "Combat Center"). The proposed desert tortoise (*Gopherus agassizii*) translocation program and the SEIS are associated with the 2012 Environmental Impact Statement (EIS) for *Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live Fire and Maneuver Training* ("2012 EIS") and the DON's Record of Decision (ROD) signed in February 2013.

The 2013 ROD documented the DON's decisions regarding establishment of a large-scale Marine Air Ground Task Force (MAGTF) training facility at the Combat Center. The purpose of the proposed action as described in the 2012 Final EIS was to accommodate sustained, combined-arms, live-fire, and maneuver training for all elements of a Marine Expeditionary Brigade (MEB)-sized MAGTF. The action was needed because existing facilities, ranges, and live-fire ground and air maneuver areas were inadequate to support the Marine Corps' requirement for MEB-sized training exercises.

A General Translocation Plan (GTP) for Desert Tortoises and a Biological Assessment were prepared in support of the 2012 Final EIS. The intent of the GTP was to provide for the translocation of tortoises from training areas in the proposed Western Expansion Area and Southern Expansion Area that would experience high to moderate levels of impact from the proposed training activities. In July 2012, the United States Fish and Wildlife Service (USFWS) issued a Biological Opinion ("the 2012 BO") that identified conservation and mitigation measures the United States Marine Corps (USMC) would need to implement to minimize the rate of mortality or injury to resident desert tortoises, including developing a detailed plan to translocate desert tortoises from areas that would experience impacts from training. Since the 2012 Final EIS and 2013 ROD, the USMC has conducted the required detailed studies and has worked cooperatively with USFWS and the Bureau of Land Management (BLM) to identify the details of alternative translocation plans for the desert tortoise, as required in the 2012 BO and the 2013 ROD. In light of this new information, the DON has elected to prepare an SEIS evaluating the potential impacts of alternative tortoise relocation plans.

Unclassified

AUG 12 2016

To adequately evaluate the potential environmental effects of the proposed action (and in accordance with 40 Code of Federal Regulations Part 1500 and Council on Environmental Quality guidance on Cooperating Agencies), the USMC as the SEIS lead agency requests that the BLM serve as a 'cooperating agency' for the development of this SEIS, as it did for the 2012 Final EIS.

The purpose of the proposed action evaluated in this SEIS is to improve the long-term success of desert tortoise translocation. The proposed action is needed to satisfy mitigation requirements identified in the 2012 Final EIS and associated 2012 BO.

The 2013 ROD committed the USMC to the following measures from the 2012 BO issued by the USFWS:

- New Special Use Areas
- Translocation Program
- Desert Tortoise "Headstarting" and Population Augmentation
- Monitoring

Impacts and issues to be addressed in the SEIS include, but are not limited to, the following resource areas: biological resources, land use, and air quality. The SEIS will include an evaluation of the proposed action's direct and indirect impacts, and will account for cumulative impacts from other relevant activities in the area of the Combat Center. Additionally, the DON will undertake any consultations required by applicable laws or regulations, including Tribal consultations.

As the lead program office, the USMC will be responsible for overseeing preparation of the SEIS. The USMC requests that the BLM, as a cooperating agency, support preparation of the SEIS in the following manner to support the expedited preparation of this SEIS with a ROD anticipated in February 2017:

- Participate in a timely and effective manner in the USMC's regulatory responsibilities;
- Advise lead program office on the scope of the proposal and analysis to be included in the SEIS;
- Provide comments on working drafts of the SEIS in accordance with the SEIS Project Schedule (enclosure 1);
- Participate in over-the-shoulder format team reviews of document iterations for expediency;
- Respond to the lead office requests for information. Timely input will be critical to ensure a successful NEPA process;
- Participate, as necessary, in discussions on SEIS-related issues; and
- Adhere to the overall schedule as set forth by the lead program office.

Please provide a response within 5 days of receipt of this letter indicating whether you accept our request that BLM serve as a cooperating agency and your point of contact for all SEIS-related matters.

5090

4E

AUG 12 2016

Should you have any questions please do not hesitate to contact me. My staff point of contact is Mr. Scott Kerr: scott.kerr@usmc.mil, (760) 830-8190.

Sincerely,



J. F. HARP
Chief of Staff

Enclosures: Project Schedule for Supplemental EIS (SEIS)

Copy to:

Katrina Symons, Field Manager
Bureau of Land Management
Barstow Field Office
2601 Barstow Road
Barstow CA 92311



United States Department of the Interior



BUREAU OF LAND MANAGEMENT

California Desert District Office
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
www.blm.gov/ca/cdd

In Reply Refer To:
1795 - P
CAD01000

August 18, 2016

Colonel James F. Harp
United States Marine Corps
Marine Air Task Force Training Command
Marine Corps Air Ground Combat Center
Box 788100
Twentynine Palms, CA 92778

Dear Colonel Harp,

On August 18, 2016, the Bureau of Land Management (BLM) received your letter requesting that we become a cooperating agency for the Department of the Navy's Supplemental Environmental Impact Statement (SEIS) to assess the potential environmental consequences of the proposed revisions to the Desert Tortoise Translocation program in and around the Marine Corps Air Ground Combat Center.

By this letter, the BLM accepts your request to be a cooperating agency for the SEIS. The BLM understands that the United States Marine Corps (USMC) will be the lead agency, responsible for the preparation of the SEIS and the BLM, as a cooperating agency, will support the preparation of the SEIS in the following manner:

- Participate in a timely and effective manner in the USMC's regulatory responsibilities;
- Advise lead program office on the scope of the proposal and analysis to be included in the SEIS;
- Provide comments on administrative/working drafts of the SEIS in accordance with the SEIS project schedule;
- Participate in the "over-the-shoulder" format team reviews of document iterations for expediency;
- Respond to lead office requests for information;
- Participate, as necessary, in discussions on SEIS-related issues; and,
- Adhere to the overall schedule as set forth by the lead agency.

The BLM looks forward to helping the USMC in developing a Memorandum of Understanding (MOU) that defines the roles and responsibilities of each agency in this endeavor.

Should you have any questions please do not hesitate to contact me or my staff point of contact – Deputy District Manager for Resources, Mr. Greg Miller: gmillier@blm.gov or 951-697-5216.

Sincerely,

Thomas F. Zale
Acting District Manager

APPENDIX D
RECORD OF NON-APPLICABILITY AND AIR
CALCULATIONS

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RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

Supplemental Environmental Assessment for Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training, Marine Corps Air Ground Combat Center, Twentynine Palms, California

INTRODUCTION

The U.S. Environmental Protection Agency published Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule, in the 30 November 1993 Federal Register (40 CFR Parts 6, 51, and 93). The Department of the Navy published Interim Guidance on Compliance with the Clean Air Act (CAA) General Conformity Rule in the Marine Corps Order P5090.2A, Change 3, dated 26 August 2013. These publications provide implementing guidance to document CAA conformity determination requirements.

Federal regulations state that no department, agency, or instrumentality of the federal government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1 51.850[a]).

The General Conformity Rule applies to Federal actions proposed within areas which are designated as either nonattainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants (i.e., carbon monoxide [CO], ozone [O₃], sulfur dioxide [SO₂], nitrogen oxides [NO_x], suspended particulate matter between 2.5 and 10 microns in diameter [PM₁₀] and less than 2.5 microns in diameter [PM_{2.5}], and lead [Pb]). Former nonattainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The Proposed Action would occur within the Mojave Desert Air Basin (MDAB) portion of San Bernardino County. The MDAB is a severe-15 O₃ nonattainment area, and is a moderate nonattainment area for PM₁₀. The MDAB attains the NAAQS for all other criteria pollutants. Therefore, only project emissions of O₃ (or its precursors, volatile organic compounds [VOCs] and NO_x), and PM₁₀ are analyzed for conformity rule applicability.

The annual *de minimis* levels for this region are listed in Table D-1. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels (40 CFR Part 1, § 51.853[b]).

Table D-1. *De minimis* Levels for Criteria Pollutants in the Mojave Desert Air Basin

Criteria Pollutant	<i>de minimis</i> Level (tons/year)
VOCs	25
NO _x	25
PM ₁₀	100

PROPOSED ACTION

Action Proponent: Department of the Navy

Location: Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, California

Proposed Action Name: Supplemental Environmental Impact Statement (SEIS) for Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training, Marine Corps Air Ground Combat Center, Twentynine Palms, California

Proposed Action Summary: The SEIS has been prepared to analyze the potential environmental impacts of a No-Action Alternative and two additional action alternatives addressing different methodologies and locations for implementing a Desert Tortoise Translocation Program in support of Marine Expeditionary Brigade (MEB)-sized training exercises. The No-Action Alternative would implement the 2011 General Translocation Plan considered in the 2012 Final EIS and the Land Acquisition Biological Opinion. Alternatives 1 would implement a March 2016 desert tortoise translocation plan and Alternative 2 would implement the revised draft of the translocation plan developed in June 2016. Alternatives 1 and 2 primarily differ from the No-Action Alternative in the size, number, and location of recipient and control areas.

Air Emissions Summary: It has been estimated that all construction activities would be completed over the course of 2 months and would begin in fiscal year (FY) 2017. Air emissions would primarily result from the use of vehicles traveling to the recipient and control sites to erect tortoise exclusion fencing and signage. Tortoises would be transported by hand or via truck to the recipient sites. During operations, vehicles would travel to the recipient sites infrequently to monitor tortoises and repair fencing. Dust suppression methods would continue to be employed as necessary. A portion of the fencing at certain recipient sites would be removed after two years, in FY 2019, and the removal is expected to take approximately 1 month.

Estimated emissions due to implementation of the Proposed Action are shown in Tables D-2, D-3, and D-4. The data presented in these tables represents the estimated emissions with implementation of the No-Action Alternative, Alternative 1, and Alternative 2. Based on the air quality analysis, the maximum estimated emissions would be below conformity *de minimis* threshold levels for the MDAB. Therefore, no significant impact to air quality would occur.

Table D-2. Total Emissions Resulting from Implementation of the No-Action Alternative

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO _x	Emissions (tons/year) CO	Emissions (tons/year) SO ₂	Emissions (tons/year) PM ₁₀	Emissions (tons/year) PM _{2.5}
Construction Emissions	0.0704	0.7625	0.4043	0.0011	0.1116	0.0381
Total Emissions (tons/year)	0.0704	0.7625	0.4043	0.0011	0.1116	0.0381
Conformity <i>de minimis</i> Limits	25	25	NA	NA	100	NA
Exceeds Conformity <i>de minimis</i> Limits?	No	No	No	No	No	No

Legend: CO = carbon monoxide; NA = not applicable; NO_x = nitrogen oxides; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; SO₂ = sulfur dioxide; VOCs = volatile organic compounds.

Table D-3. Total Emissions Resulting from Implementation of Alternative 1

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO _x	Emissions (tons/year) CO	Emissions (tons/year) SO ₂	Emissions (tons/year) PM ₁₀	Emissions (tons/year) PM _{2.5}
Construction Emissions	0.0704	0.7625	0.4043	0.0011	0.0729	0.0339
Helicopter Emissions	0.0002	0.0060	0.0031	NA	0.0050	NA
Total Emissions (tons/year)	0.0706	0.7685	0.4074	0.0011	0.0779	0.0339
Conformity <i>de minimis</i> Limits	25	25	NA	NA	100	NA
Exceeds Conformity <i>de minimis</i> Limits?	No	No	No	No	No	No

Legend: CO = carbon monoxide; NA = not applicable; NO_x = nitrogen oxides; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; SO₂ = sulfur dioxide; VOCs = volatile organic compounds.

Table D-4. Total Emissions Resulting from Implementation of Alternative 2

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO _x	Emissions (tons/year) CO	Emissions (tons/year) SO ₂	Emissions (tons/year) PM ₁₀	Emissions (tons/year) PM _{2.5}
Construction Emissions	0.0704	0.7625	0.4043	0.0011	0.0687	0.0335
Helicopter Emissions	0.0002	0.0060	0.0031	NA	0.0050	NA
Total Emissions (tons/year)	0.0706	0.7685	0.4074	0.0011	0.0737	0.0335
Conformity <i>de minimis</i> Limits	25	25	NA	NA	100	NA
Exceeds Conformity <i>de minimis</i> Limits?	No	No	No	No	No	No

Legend: CO = carbon monoxide; NA = not applicable; NO_x = nitrogen oxides; PM₁₀ = particulate matter less than 10 microns in diameter but greater than 2.5 microns in diameter; PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter; SO₂ = sulfur dioxide; VOCs = volatile organic compounds.

Affected Air Basin: Mojave Desert Air Basin

Date RONA Prepared: August 31, 2016

RONA Prepared By: MCAGCC Twentynine Palms with direct support from Cardno

ATTAINMENT AREA STATUS AND EMISSIONS EVALUATION CONCLUSION

The MDAB is a severe-15 nonattainment area for the 8-hour O₃ NAAQS; VOCs and NO_x are precursors to the formation of O₃. The MDAB is also a moderate nonattainment area for PM₁₀. Emissions associated with construction and operational activities for the Proposed Action were calculated using the California Emissions Estimation Model, which is the current air quality model for land use projects in California. Emissions were then compared with *de minimis* thresholds for the MDAB.

The USMC concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting that conclusion are shown in Tables D-2 and D-3, which is a summary of the calculations, methodology, and data attached to this RONA. Therefore, the USMC concludes that further formal conformity determination procedures are not required.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that the Proposed Action does not require a formal CAA conformity determination.

L.A. CRAPAROTTA
Major General, United States Marine Corps

Date

29 Palms Land Acquisition and Airspace Establishment SEIS: No-Action Alternative
Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.00	0	147.04	0	0

1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	31
Climate Zone	10			Operational Year	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project specific input, desert setting

Construction Phase - Project-specific phases

Off-road Equipment - Off-Highway Trucks = pickup truck, water truck; Bore/Drill Rigs = vibrating post driver

Off-road Equipment - Off-Highway Trucks = pickup truck, water truck; Bore/Drill Rigs = gas powered auger

Grading - All acres project acreage will be disturbed during fence installation

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	120.00	30.00
tblConstructionPhase	NumDays	120.00	30.00
tblConstructionPhase	PhaseEndDate	3/24/2017	3/25/2017
tblConstructionPhase	PhaseEndDate	2/10/2017	2/11/2017
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Tortoise Translocation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Tortoise Translocation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblProjectCharacteristics	OperationalYear	2014	2017
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

Note: NA = Not Applicable

Unmitigated Construction

Mitigated Construction

Percent Reduction in Emissions with Mitigation Measures Applied

[illegible]

Percent Reduction in Emissions with Mitigation Measures Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Fence Installation	Site Preparation	1/1/2017	2/11/2017	5	30	NA
2	Tortoise Translocation	Site Preparation	2/12/2017	3/25/2017	5	30	NA

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Fence Installation	Bore/Drill Rigs	1	4.00	205	0.50
Fence Installation	Generator Sets	1	8.00	84	0.74
Fence Installation	Off-Highway Trucks	2	8.00	400	0.38
Fence Installation	Trenchers	1	4.00	80	0.50
Tortoise Translocation	Bore/Drill Rigs	1	4.00	205	0.50
Tortoise Translocation	Off-Highway Trucks	2	8.00	400	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Fence Installation	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Tortoise Translocation	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Not Applicable

3.2 Fence Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0780	0.0000	0.0780	8.4200e-003	0.0000	8.4200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0411	0.4315	0.2331	5.8000e-004	0.0000	0.0192	0.0192	0.0000	0.0180	0.0180	0.0000	53.5504	53.5504	0.0145	0.0000	53.8548
Total	0.0411	0.4315	0.2331	5.8000e-004	0.0780	0.0192	0.0972	8.4200e-003	0.0180	0.0265	0.0000	53.5504	53.5504	0.0145	0.0000	53.8548

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705
Total	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705

3.2 Fence Installation - 2017 (continued)**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0780	0.0000	0.0780	8.4200e-003	0.0000	8.4200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0411	0.4315	0.2331	5.8000e-004	0.0000	0.0192	0.0192	0.0000	0.0180	0.0180	0.0000	53.5503	53.5503	0.0145	0.0000	53.8548
Total	0.0411	0.4315	0.2331	5.8000e-004	0.0780	0.0192	0.0972	8.4200e-003	0.0180	0.0265	0.0000	53.5503	53.5503	0.0145	0.0000	53.8548

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705
Total	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705

3.3 Tortoise Translocation - 2017**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372
Total	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372
Total	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372

Mitigated Construction Off-Site

[illegible]

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Not Applicable

4.2 Trip Summary Information

Not Applicable

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
NA	0	0	0	0	0	0	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.434564	0.068056	0.178415	0.157220	0.054651	0.008723	0.006985	0.074355	0.001157	0.001000	0.009707	0.000674	0.004492

4.4 Fleet Mix

Not Applicable

Not Applicable

[illegible][illegible][illegible]

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total	0	0.0000	0.0000	0.0000	0.0000

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total	0	0.0000	0.0000	0.0000	0.0000

[illegible]

7.0 Water Detail

7.1 Mitigation Measures Water

Not Applicable

8.0 Waste Detail

8.1 Mitigation Measures Waste

Not Applicable

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Not Applicable	0	0	0	0	0	NA

10.0 VegetationNot Applicable

29 Palms Land Acquisition and Airspace Establishment SEIS: Alternative 1

Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.00	0	74.15	0	0

1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	31
Climate Zone	10			Operational Year	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project specific input, desert setting

Construction Phase - Project-specific phases

Off-road Equipment - Off-Highway Trucks = pickup truck, water truck; Bore/Drill Rigs = vibrating post driver

Off-road Equipment - Off-Highway Trucks = pickup truck, water truck; Bore/Drill Rigs = gas powered auger

Grading - All project acreage will be disturbed during fence installation

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	40.00	30.00
tblConstructionPhase	NumDays	40.00	30.00
tblConstructionPhase	PhaseEndDate	3/24/2017	3/25/2017
tblConstructionPhase	PhaseEndDate	2/10/2017	2/11/2017
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblProjectCharacteristics	OperationalYear	2014	2017
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

Note: NA = Not Applicable

Unmitigated Construction

Mitigated Construction

Percent Reduction in Emissions with Mitigation Measures Applied

[illegible]

2.2 Overall Operational

Unmitigated Operational

[illegible]

Mitigated Operational

[illegible]

Percent Reduction in Emissions with Mitigation Measures Applied

[illegible]

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Fence Installation	Site Preparation	1/1/2017	2/11/2017	5	30	NA
2	Tortoise Translocation	Site Preparation	2/12/2017	3/25/2017	5	30	NA

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Fence Installation	Bore/Drill Rigs	1	4.00	205	0.50
Fence Installation	Generator Sets	1	8.00	84	0.74
Fence Installation	Off-Highway Trucks	2	8.00	400	0.38
Fence Installation	Trenchers	1	4.00	80	0.50
Tortoise Translocation	Bore/Drill Rigs	1	4.00	205	0.50
Tortoise Translocation	Off-Highway Trucks	2	8.00	400	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Fence Installation	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Tortoise Translocation	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Not Applicable

3.2 Fence Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0393	0.0000	0.0393	4.2500e-003	0.0000	4.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0411	0.4315	0.2331	5.8000e-004	0.0000	0.0192	0.0192	0.0000	0.0180	0.0180	0.0000	53.5504	53.5504	0.0145	0.0000	53.8548
Total	0.0411	0.4315	0.2331	5.8000e-004	0.0393	0.0192	0.0585	4.2500e-003	0.0180	0.0223	0.0000	53.5504	53.5504	0.0145	0.0000	53.8548

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705
Total	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705

3.2 Fence Installation - 2017 (continued)**Mitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0393	0.0000	0.0393	4.2500e-003	0.0000	4.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0411	0.4315	0.2331	5.8000e-004	0.0000	0.0192	0.0192	0.0000	0.0180	0.0180	0.0000	53.5503	53.5503	0.0145	0.0000	53.8548
Total	0.0411	0.4315	0.2331	5.8000e-004	0.0393	0.0192	0.0585	4.2500e-003	0.0180	0.0223	0.0000	53.5503	53.5503	0.0145	0.0000	53.8548

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705
Total	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705

3.3 Tortoise Translocation - 2017**Unmitigated Construction On-Site**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372
Total	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372
Total	0.0285	0.3292	0.1555	4.6000e-004	0.0000	0.0119	0.0119	0.0000	0.0110	0.0110	0.0000	42.6627	42.6627	0.0131	0.0000	42.9372

Mitigated Construction Off-Site

[illegible]

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Not Applicable

4.2 Trip Summary Information

Not Applicable

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.434564	0.068056	0.178415	0.157220	0.054651	0.008723	0.006985	0.074355	0.001157	0.001000	0.009707	0.000674	0.004492

4.4 Fleet Mix

Not Applicable

Historical Energy Use: N

Not Applicable

[illegible]

Unmitigated

[illegible]

Mitigated

[illegible]

6.0 Area Detail

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Consumer Products	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Architectural Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

7.0 Water Detail

7.1 Mitigation Measures Water

Not Applicable

8.0 Waste Detail

8.1 Mitigation Measures Waste

Not Applicable

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Not Applicable	0	0	0	0	0	NA

10.0 VegetationNot Applicable

29 Palms Land Acquisition and Airspace Establishment SEIS: Alternative 2

Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	0.00	0	66.14	0	0

1.2 Other Project Characteristics

Urbanization	Rural	Wind Speed (m/s)	2.6	Precipitation Freq (Days)	31
Climate Zone	10			Operational Year	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	CH4 Intensity (lb/MWhr)	0.029	N2O Intensity (lb/MWhr)	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Project-specific acreage, desert setting

Construction Phase - Project-specific construction phases

Off-road Equipment - Off-highway trucks = pickup truck, water truck; bore/drill rigs = vibrating post driver

Off-road Equipment -

Off-road Equipment - Off-highway trucks = pickup truck, water truck; bore/drill rigs = gas-powered auger

Grading - All project acreage will be disturbed during fence installation

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	40.00	30.00
tblConstructionPhase	NumDays	40.00	30.00
tblConstructionPhase	PhaseEndDate	3/24/2017	3/25/2017
tblConstructionPhase	PhaseEndDate	2/10/2017	2/11/2017
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblOffRoadEquipment	PhaseName	NA	Fence Installation
tblProjectCharacteristics	OperationalYear	2014	2017
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural

Note: NA = Not Applicable

Unmitigated Construction

Mitigated Construction

Percent Reduction in Emissions with Mitigation Measures Applied

[illegible]

2.2 Overall Operational

Unmitigated Operational

[illegible]

Mitigated Operational

[illegible]

Percent Reduction in Emissions with Mitigation Measures Applied

[illegible]

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Fence Installation	Site Preparation	1/1/2017	2/11/2017	5	30	NA
2	Tortoise Translocation	Site Preparation	2/12/2017	3/25/2017	5	30	NA

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Fence Installation	Bore/Drill Rigs	1	4.00	205	0.50
Fence Installation	Generator Sets	1	8.00	84	0.74
Fence Installation	Off-Highway Trucks	2	8.00	400	0.38
Fence Installation	Trenchers	1	4.00	80	0.50
Tortoise Translocation	Bore/Drill Rigs	1	4.00	205	0.50
Tortoise Translocation	Off-Highway Trucks	2	8.00	400	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Fence Installation	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Tortoise Translocation	3	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Not Applicable

3.2 Fence Installation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0351	0.0000	0.0351	3.7900e-003	0.0000	3.7900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0411	0.4315	0.2331	5.8000e-004	0.0000	0.0192	0.0192	0.0000	0.0180	0.0180	0.0000	53.5504	53.5504	0.0145	0.0000	53.8548
Total	0.0411	0.4315	0.2331	5.8000e-004	0.0351	0.0192	0.0543	3.7900e-003	0.0180	0.0218	0.0000	53.5504	53.5504	0.0145	0.0000	53.8548

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705
Total	8.1000e-004	1.7100e-003	0.0157	3.0000e-005	2.4400e-003	2.0000e-005	2.4600e-003	6.5000e-004	2.0000e-005	6.6000e-004	0.0000	2.0678	2.0678	1.3000e-004	0.0000	2.0705

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0351	0.0000	0.0351	3.7900e-003	0.0000	3.7900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0411	0.4315	0.2331	5.8000e-004	0.0000	0.0192	0.0192	0.0000	0.0180	0.0180	0.0000	53.5503	53.5503	0.0145	0.0000	53.8548
Total	0.0411	0.4315	0.2331	5.8000e-004	0.0351	0.0192	0.0543	3.7900e-003	0.0180	0.0218	0.0000	53.5503	53.5503	0.0145	0.0000	53.8548

[illegible]

[illegible]

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Not Applicable

4.2 Trip Summary Information

Not Applicable

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
NA	0	0	0	0	0	0	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.434564	0.068056	0.178415	0.157220	0.054651	0.008723	0.006985	0.074355	0.001157	0.001000	0.009707	0.000674	0.004492

4.4 Fleet Mix

Not Applicable

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Not Applicable

Mitigated and Unmitigated

[illegible]

5.2 Energy by Land Use - NaturalGas

Unmitigated

[illegible]

5.2 Energy by Land Use - NaturalGas (cont.)**Mitigated**

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.3 Energy by Land Use - Electricity**Unmitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total	0	0.0000	0.0000	0.0000	0.0000

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total	0	0.0000	0.0000	0.0000	0.0000

6.1 Mitigation Measures Area

[illegible]

Unmitigated

[illegible]

Mitigated

[illegible]

7.0 Water Detail

7.1 Mitigation Measures Water

Not Applicable

8.0 Waste Detail

8.1 Mitigation Measures Waste

Not Applicable

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Not Applicable	0	0	0	0	0	NA

10.0 VegetationNot Applicable

29 Palms Land Acquisition and Airspace Establishment: Alternatives 1 and 2
Helicopter Emissions

Annual Estimated Emissions from the Proposed Project within the MDAB: Alternatives 1 & 2

Emission Source	Emissions (tons/year) VOCs	Emissions (tons/year) NO_x	Emissions (tons/year) CO	Emissions (tons/year) SO₂	Emissions (tons/year) PM₁₀	Emissions (tons/year) PM_{2.5}	Metric tons per year CO₂	Metric tons per year CH₄	Metric tons per year N₂O	Metric tons per year CO₂e
Helicopter Emissions	0.0002	0.0060	0.0031	N/A	0.0050	N/A	63.9413	N/A	N/A	63.9413
Total Emissions (tons/year)	0.0002	0.0060	0.0031	N/A	0.0050	N/A	63.9413	N/A	N/A	63.9413

Notes:

The CO₂e for helicopter emissions was calculated via the USEPA's Greenhouse Gas Equivalencies Calculator, located at: <http://www2.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

N/A = not available or not applicable